GASTROENTEROLOGY

ABSTRACTS AND CITATIONS

NATIONAL INSTITUTE OF ARTHRITIS, METABOLISM, AND DIGESTIVE DISEASES

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Public Health Service
National Institutes of Health

SEPTEMBER 1978
VOLUME 12, NO. 9
6568—7270

7358

Volume 12 No. 9 Abstract and Citation Nos. 6568–7270

GASTROENTEROLOGY ABSTRACTS AND CITATIONS

A monthly publication of the
National Institute of Arthritis, Metabolism, and Digestive Diseases

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for the
National Institute of Arthritis, Metabolism, and Digestive Diseases
pursuant to Contract Number NO1-AM-4-2204
with the PHS, USDHEW

DHEW Publication No. (NIH) 79-66

ISSN 0016-5093

PREFACE

GASTROENTEROLOGY ABSTRACTS and CITATIONS is a publication of the National Institute of Arthritis, Metabolism and Digestive Diseases. This specialized information medium has been initiated to fill an existing great need in the field of gastroenterology and to assist the Institute in meeting its obligations to foster and support laboratory and clinical research into the nature, causes, and therapy of diseases of the gastrointestinal tract. Publication GASTROENTEROLOGY ABSTRACTS and CITATIONS makes available citations of all current papers relevant to this field from medical journals published throughout the world. Approximately one-third of the citations dealing with the major aspects of gastroenterology have accompanying abstracts.

The issuing of GASTROENTEROLOGY ABSTRACTS and CITATIONS under the auspices of the National Institute of Arthritis, Metabolism, and Digestive Diseases will provide a much needed current awareness tool to scientists and will facilitate greater integration of research and clinical efforts in this field. The number and great diversity of publications in the area of gastroenterology makes it imperative that an appropriate service be available to investigators and practitioners so that they may be apprised of progress with a minimum of delay. Our aim is to provide the readers with a readily systematized compilation of current published work. The publication will provide the greatest usefulness if these interested investigators will contribute their ideas and comments for consideration whenever possible.

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The Secretary of the Department of Health, Education, and Welfare has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Department. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through April 30, 1981.

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NOTE

Journal names are abbreviated according to the list of abbreviations used by *Index Medicus*. For journals not covered by *Index Medicus*, the abbreviations (with some modifications) found in *International Standard ISO833, 1974*, are used. The two-letter state abbreviations are based on the United States Postal Service Code.

LANGUAGE ABBREVIATIONS

Afrikaans	Afr.	Georgian	Geo.	Persian	Per.
Albanian	Alb.	German	Ger.	Polish	Pol.
Arabic	Ara.	Greek	Gre.	Portuguese	Por.
Armenian	Arm.	Hausa	Hau.	Pushto	Pus.
Azerbaijani	Aze.	Hebrew	Heb.	Rumanian	Rum.
Belorussian	Bel.	Hindi	Hin.	Russian	Rus.
Bengali	Ben.	Hungarian	Hun.	Serbian	Ser.
Bulgarian	Bul.	Icelandic	Ice.	Slovak	Slo.
Burmese	Bur.	Indonesian	Ind.	Slovene	Slv.
Chinese	Chi.	Interlingua	Int.	Spanish	Spa.
Croatian	Cro.	Italian	Ita.	Swahili	Swa.
Czechoslovakian	Cze.	Japanese	Jpn.	Swedish	Swe.
Danish	Dan.	Kirghiz	Kir.	Tagalog	Tag.
Dutch	Dut.	Korean	Kor.	Tamil	Tam.
English	Eng.	Latin	Lat.	Telugu	Tel.
Esperanto	Esp.	Latvian	Lav.	Thai	Tha.
Estonian	Est.	Lithuanian	Lit.	Turkish	Tur.
Finnish	Fin.	Marathi	Mar.	Ukranian	Ukr.
Flemish	Fle.	Masai	Mas.	Urdu	Urd.
French	Fre.	Multilingual	Mlt.	Vietnamese	Vie.
Gaelic	Gae.	Norwegian	Nor.	Welsh	Wel.

ABBREVIATIONS USED IN ABSTRACTS

ACTH	adrenocorticotropic hormone	ml, µl	milli-, microliter(s)
ADP	adenosine diphosphate	mm	millimeter(s)
AMP	adenosine monophosphate	mOsm	milliosmolar; milliosmeter(s)
amp	ampere	msec	millisecond(s)
ATP	adenosine triphosphate	mV	millivolt(s)
A	angstrom	min	minute(s)
BSP	sulfobromophthalein	MTD	maximum tolerated dose
C	degrees centigrade	NAD	nicotinamide adenine dinucleotide
cal	calories	NADH	reduced nicotinamide adenine dinucleotide
cc	cubic centimeter		
cm	centimeter(s)	NADP	nicotinamide adenine dinucleotidephosphate
dl	deciliter		
DNA	deoxyribonucleic acid	NADPH	reduced nicotinamide adenine dinucleotidephosphate
ED_{50}	median effective dose(s)		
EDTA	ethylenediamine tetraacetic acid	ng	nanogram (10^{-9})
e.g.	for example	nm	nanometer(s)
EEG	electroencephalogram	Pa	ambient pressure
ESR	erythrocyte sedimentation rate	PAS	periodic acid - Schiff
g	gram(s)	pg	picogram (10^{-12})
µg	microgram(s)	pgEq	picogram equivalent(s)
Hz	Hertz	p.o.	orally
hr	hour(s)	ppb	parts per billion
Ig	immunoglobulin(s)	ppm	parts per million
i.m.	intramuscular	r	Roentgen
i.p.	intraperitoneal	RBC	red blood cells (erythrocytes), red blood count
IU	international unit(s)		
i.v.	intravenous	resp.	respectively
kcal	kilocalorie(s)	RNA	ribonucleic acid
kg	kilogram(s)	s.c.	subcutaneous
K_m	Michaelis constant	sec	second(s)
LD_{50}	median lethal dose(s)	SGOT	serum glutamic-oxalacetic transaminase
LDH	lactic acid dehydrogenase		
m	meter(s)	SGPT	serum glutamic-pyruvic transaminase
M	molar; mole(s)		
mM	millimolar; millimole(s)	U	unit(s)
µM	micromolar; micromole(s)	UV	ultraviolet
ma	milliampere(s)	V	volt
mCi, µCi	milli-, microcurie(s)	WBC	white blood cells (leukocytes), white blood count
mEq	milliequivalent(s)		
mg	milligram(s)	yr	year(s)

PRE-CLINICAL SCIENCES

MORPHOLOGY, CELLULAR STRUCTURE AND HISTOCHEMISTRY

6568 IMMUNOHISTOCHEMICAL IDENTIFICATION OF GASTROINTESTINAL NEUROTENSIN CELLS IN HUMAN EMBRYOS. (Eng.) Helmstaedter, V.; Muhlmann, B.; Feurle, G. E.; Forssmann, W. G. (Anatomisches Institut der Universitat, Im Neuenheimer Feld 307, D-6900 Heidelberg, W. Germany). *Cell Tissue Res.* 184(3):315-320; 1977.

The development of the endocrine gastroenteropancreatic (GEP) system was studied in 10 human embryos (4-21 weeks), with special reference to neurotensin-immunoreactive cells. These cells were first present in the ileal and jejunal mucosa of 12- to 13-week-old embryos. Thereafter, the neurotensin-immunoreactive cells were found regularly in these segments of the gut with an increasing number of them towards the terminal ileum. At about the 20th week of gestation, the neurotensin cells were detected also in the lower duodenum, i.e., the distribution pattern was more extensive at this age than in younger embryos or adults. The cells were of triangular or elongated shape and their apical pole reached the gut lumen, and they thus looked like other types of small intestinal endocrine cells.

6569 ULTRASTRUCTURE OF THE HUMAN ANTRAL G CELLS DURING FASTING. (Eng.) Zaviacic, M.; Brozman, M.; Jakubovsky, J.; Duris, I. (Inst. Pathology, Komensky Univ., Sasinkova 4, 80100 Bratislava, Czechoslovakia). *Exp. Pathol. (Jena)* 14(3/4):131-135; 1977.

To study the influence of fasting on the ultrastructure of the human antral G cells, six healthy men who were fasted for 24 hr, a seventh (heavier than average weight) who was fasted for 240 hr, and two controls were examined by gastrobiopsy carried out without morphine or atropine. The biopsy material was prepared immediately for electron microscopy. In the controls and in the subjects fasted for 24 hr (3 had water and 3 did not), G cells with granules of different densities and with emptied granules were found; the numerical ratio of the dense and emptied granules was variable. Dense lysosomes were rarely seen in these cells. The subject who was fasted for 240 hr was examined at both 72 and 240 hr. At both times, the G cells had mostly emptied granules. In some of the granules, small residues of contents were observed. The membrane of the granules was preserved. Emiocytosis did not occur. At 240 hr, dense lysosomes with engulfed granules were seen. The authors believe that the dissolution of the granules in the G cells was due to the long fasting and not to the mechanical irritation of the gastrobiopsy technique. The role of psychic stress during fasting cannot be estimated in this experiment.

6570 CULTURE OF ISOLATED SMOOTH MUSCLE CELLS OF RAT DUODENUM. (Fre.) Miachon, S.; Biol, M. C.; Cier, J. F.; Chardonnet, Y. (UER Medicale Grange Blanche, 8 avenue Rockefeller, 69373 Lyon Cedex 2, France). *C.R. Soc. Biol. (Paris)* 171(4):804-808; 1977.

Smooth muscle cells were isolated from Sprague-Dawley rat duodena by either trypsinization (0.2%) or collagenation (0.05%) and cultured to study their catecholamine receptors. The cells were cultured in either Eagles' minimum essential medium (MEM) with glutamine and nonessential amino acids or medium RPMI 1640 (from Gibco), both with 10% fetal calf serum. Transfers were attempted on the 15th day (the cells were confluent) by mechanical means and/or trypsinization. The best results were achieved when trypsinization was used to isolate the cells; there was no difference in results between the two culture media. At the beginning, the cultures consisted mainly of smooth muscle cells and a few fibroblasts; on day 5, myofibrils were identifiable in 20% of the cells, and on day 12, in 2%. Two transfers were performed over a period of 50 days, although very few cells could be induced to grow again. Trypsinization only was the least damaging method of cell transfer. Myofibrils were not demonstrable in any of the transferred cells. In view of the rapid dedifferentiation and low yield of cells, this method is, at present, rather unsuitable for the study of receptor sites.

6571 DUODENAL BOMBESIN CELL PATHOLOGY [Abstract]. (Eng.) McCrossan, M. V.; Polak, J. M.; Bloom, S. R.; Hobbs, S.; Pearse, A. G. E. (Hammersmith Hosp., London, England). *Gut* 18(5):A407; 1977.

6572 INDIVIDUAL VARIANTS OF THE LOCATION OF THE HEPATIC ARTERIES IN THE LOWER HALF OF THE HEPATODUODENAL LIGAMENT. (Rus.) Yakubovskaya, E. V.; Tabakov, A. I. (Zaporozhe Inst. Advanced Training Physicians, Zaporozhe, USSR). *Vestn. Khir.* 120(1):23-26; 1978.

6573 INTRAEPITHELIAL LYMPHOCYTES OF THE SMALL INTESTINE. PART 1: MORPHOLOGY AND EXPERIMENTAL IMMUNOLOGY OF INTRAEPITHELIAL LYMPHOCYTES. (Eng.) Ferguson, A. (Western General Hosp., Edinburgh, Scotland). *Gut* 18(11):921-937; 1977.

6574 ULTRASTRUCTURE OF THE INNERVATION OF THE DUCTS WITHIN THE RABBIT PAROTID GLAND. (Eng.) Cope, G. H. (Dept. Human Biology and Anatomy, Univ. Sheffield, Sheffield S10 2TN, England). *Arch. Oral Biol.* 22(12):715-719; 1977.

6575 ULTRASTRUCTURAL LOCALIZATION OF ADRENERGIC NERVE TERMINALS IN THE CIRCULAR MUSCLE LAYER AND MUSCULARIS MUCOSAE OF RAT DUODENUM AFTER

MORPHOLOGY, CELLULAR STRUCTURE AND HISTOCHEMISTRY

ACUTE TREATMENT WITH 6-HYDROXYDOPAMINE. (Eng.) Wong, W. C. (Faculty Medicine, Univ. Singapore, Sepoy Lines, Singapore 3, Singapore). *J. Anat.* 124(3):637-642; 1977.

6576 ADRENERGIC INNERVATION OF THE HUMAN GALL BLADDER. (Eng.) Kyosola, K.; Penttila, O. (Dept. Anatomy, Univ. Helsinki, Siltavuorenpenger 20 A, SF-00170 Helsinki 17, Finland). *Histochemistry* 54(3):209-218; 1977.

6577 VILLUS GROWTH AND CELL REPLACEMENT IN THE SMALL INTESTINE OF THE NEONATAL PIG. (Eng.) Smith, M. W.; Jarvis, L. G. (ARC Inst. Animal Physiology, Babraham, Cambridge CB2 4AT, England). *Experientia* 33(12):1587-1588; 1977.

6578 ELECTRON MICROSCOPY OF THE CONNECTIVE TISSUES BETWEEN LONGITUDINAL AND CIRCULAR MUSCLE OF SMALL INTESTINE OF CAT. (Eng.) Taylor, A. B.; Kreulen, D.; Prosser, C. L. (Dept. Physiology and Biophysics, Univ. Illinois, Urbana, IL 61801). *Am. J. Anat.* 150(3):427-441; 1977.

6579 THE RESULTS OF LIGHT AND ELECTRON MICROSCOPIC INVESTIGATIONS ON THE QUALITY OF VESSEL NERVES IN THE STOMACH. (Eng.) Stach, W. (Bereichs Medizin der Wilhelm-Pieck Universitat, Gertrudenstrasse 9, GDR-25 Rostock, E. Germany). *Fol. Morphol. (Praha)* 25(3):217-219; 1977.

See also, 6642, 6652, 6676, 6741, 6747, 6748, 6841, 7101, 7209.

ABSORPTION - EXCRETION - TRANSPORT

6580 FAILURE OF GLUCAGON TO INFLUENCE ION TRANSPORT ACROSS HUMAN JEJUNAL AND ILEAL MUCOSA IN VITRO. (Eng.) Isaacs, P. E. T.; Turnberg, L. A. (Hope Hosp., Eccles Old Rd., Salford, M6 8HD, England). *Gut* 18(12):1059-1061; 1977.

To assess whether glucagon-stimulated intestinal secretion is due to a direct effect on mucosal ion transport or is secondary to motility and blood flow changes, the influence of glucagon on human intestinal mucosa was studied *in vitro* where these complicating factors are eliminated. Stripped human intestinal mucosa from surgical specimens was used. The mucosal potential difference (PD), short-circuit current (SCC), and resistance (R) tended to fall in all tissues tested, and there was no difference between controls and glucagon-treated (0.2, 0.5, 1.0, or 2.0 ng/ml) tissues. Measurement of ion fluxes in jejunal and ileal mucosa revealed that glucagon (0.2-2.0 ng/ml) did not influence ion transport in either tissue. Net sodium absorption in the presence of glucose was greater in ileal than in jejunal tissues. Net chloride transport was not significantly different from zero in jejunal tissues, but there was a marked absorption of chloride in most ileal tissues. These results confirm previous reports of differences between the *in vitro* behavior of jejunal and ileal mucosa and suggest that the intestinal secretion and diarrhea produced *in vivo* in man during i.v. infusion of glucagon may be produced by changes in motility and blood flow.

6581 MECHANISMS OF TRANSPORT OF Na, Cl, AND K IN THE HUMAN COLON. (Eng.) Hawker, P. C.; Mashiter, K. E.; Turnberg, L. A. (Hope Hosp., Eccles Old Rd., Salford M6 8HD, Lancashire, England). *Gastroenterology* 74(6):1241-1247; 1978.

In view of the apparent discrepancies between species in colonic transport, ionic transport across isolated, stripped, human colonic mucosa was studied *in vitro* using a modified short circuit current technique. Electrical potential difference and short circuit current were dependent on the presence of sodium ions in the mucosal bathing solution and were unaffected by addition of 10 mM glucose to the solution. Ouabain (10^{-3} M) added to the serosal reservoir abolished both potential difference and short circuit current. Isotopic flux measurements across short-circuited colonic mucosa showed a net active sodium absorption that accounted for the observed short circuit current and was unaffected by 10 mM glucose. Chloride was also actively absorbed and this was unaffected by removal of sodium from the bathing solutions. Ouabain abolished net sodium absorption but had no effect on chloride absorption. There was a net active secretion of potassium that was abolished in sodium-free buffer. It is concluded that sodium is actively absorbed via a rheogenic process that is not stimulated by glucose; chloride is actively absorbed via a non-electrogenic process, not linked to sodium transport, and probably involving a $Cl^-HCO_3^-$ exchange; and potassium is actively secreted possibly via a Na^+K^+ exchange.

6582 EFFECTS OF DIETARY PROTEIN ON BODY WEIGHT, MUCOSAL GROWTH, AND CALCIUM ABSORPTION

IN THE RAT. (Eng.) Moyer, G. L.; Wilson, H. D.; Schedl, H. P. (Univ. Iowa Coll. Medicine, Iowa City, IA 52242). *Am. J. Dig. Dis.* 23(6):545-549; 1978.

To determine whether a duodenal or ileal calcium transport response could account for decreased fecal calcium excretion reported in rats fed high-protein diets, calcium transport by these two segments was examined directly by *in situ* perfusion. Weight-matched growing rats were pair-fed isocaloric diets for 6-8 days containing 89% protein (casein), 39% protein, or 0% protein. Sucrose was substituted for the decreased casein in the 39% and 0% protein diets. Each diet also contained 5% fat, a mineral mix, and vitamins. Calcium content of all diets was 0.5%. Body weight was maintained by the 39% protein group; weight loss was 5% for the 89% protein group and 18% for the 0% protein group. Small intestinal weight as a percentage of body weight was the same for the three groups. For both the duodenum and the ileum, mucosal dry weight was greater in the 39% protein group (11.0 ± 0.3 and 7.6 ± 0.2 mg/cm, resp.) than either the 89% protein (9.6 ± 0.4 and 6.4 ± 0.3 mg/cm, resp.) or 0% protein group (9.2 ± 0.3 and 5.9 ± 0.3 mg/cm, resp). Calcium absorption per gram dry weight of mucosa (absorptive specific activity) was the same for all diet groups, but because of the greater mucosal weight per unit length in the 39% protein group, absorption per centimeter was increased in this group. Although no direct relation between dietary protein and mucosal absorptive specific activity for calcium was found, calcium absorption was determined by the amount of mucosa that was dependent on protein intake and reflected the nutritional status of the body.

6583 THE EFFECT ON INTESTINAL CALCIUM ABSORPTION OF SOMATOSTATIN IN MAN. (Eng.) Evensen, D.; Hanssen, K. F.; Berstad, A. (Aker Hosp., Oslo 5, Norway). *Scand. J. Gastroenterol.* 13(4):449-451; 1978.

The effect of somatostatin on intestinal calcium absorption was investigated in nine healthy subjects to determine whether the action of the hormone is related to its ability to interfere with calcium transport mechanisms. Using an isotope method with ^{51}Cr as a stool marker, the absorption of ^{47}Ca was measured with and without an i.v. infusion of cyclic somatostatin (250 µg/hr, 2 hr). Net absorption fell from 53.0 ± 14% without the infusion to 40.4 ± 13% with somatostatin ($p<0.05$). The results suggest that the actions of somatostatin may be mediated via an inhibition of active calcium transport.

6584 GLUCOSE TRANSPORT BY RAT SMALL INTESTINE AFTER EXTENSIVE SMALL-BOWEL RESECTION. (Eng.) Urban, E.; Haley, D. P. (Audie L. Murphy Memorial Veterans Hosp., 7400 Merton Minter Blvd., San Antonio, TX 78284). *Am. J. Dig. Dis.* 23(6): 531-540; 1978.

Glucose transport by the rat small intestine was studied after extensive bowel resection. Fifty centimeters of proximal or distal small intestine were resected, preserving duodenum and terminal ileum. Glucose transport was studied 5-6 weeks later, using everted gut sacs from duodenum, ileum, and also from a midgut segment consisting of intestine located preresection at mid-small intestine. Sham-operated animals served as controls. In controls, the inner (serosal) fluid medium in sacs from duodenum and midgut gained glucose; ileal sac serosal medium lost glucose. Proximal resection resulted in significant growth of duodenal and midgut mucosa ($p<0.05$). Duodenal transport specific activity decreased from control values (from 77.5 ± 9.8 to 36.2 ± 4.7 µmol/g dry mucosa in 1 hr), but mucosal growth compensated so sac transport capacity (transport/cm sac length) remained unchanged. Midgut transport specific activity remained unchanged; thus sac transport capacity directly mirrored increased mucosal mass. Ileal sac serosal medium now accumulated glucose; there was no mucosal growth. Transport specific activity and sac transport capacity of ileum increased in parallel. After distal resection, there was no alteration of either duodenal and midgut mucosal masses or transport specific activities; hence sac transport capacities remained unchanged. Ileal sac serosal medium also accumulated glucose, but now both transport specific activity and mucosal mass increased. The resultant increased sac transport capacity was identical to that of ileum after proximal resection. In all sacs from control and resected animals, uphill ^{14}C-glucose concentration differences developed between medium and mucosa. Activity of the mucosal uptake process, assessed in terms of a ratio of mucosal intracellular fluid radioactivity to mucosal medium radioactivity, usually mirrored altered transport specific activity. This indicates that the increased undercoats tissue mass that accompanied increased mucosal mass did not critically affect transport. The most striking findings were: (1) decreased duodenal transport specific activity after proximal resection with mucosal growth compensating and (2) identical adaptations of ileal segment transport capacities after either proximal or distal small bowel resections, although mechanisms differed. The present study provides a base for further examinations of carrier-mediated hexose transport after extensive loss of small intestine.

6585 ASCORBATE STIMULATION OF SALICYLATE ABSORPTION IN ISOLATED RAT INTESTINE. (Eng.) Barnett, G.; Lockwood, T.; Arancibia, A.; Benet, L. Z. (Natl. Inst. on Drug Abuse, Rockville, MD 20857). *J. Pharm. Sci.* 67(2):224-226; 1978.

The interaction of ascorbate with salicylate transport across the isolated rat intestine was studied *in vivo* and *in vitro*. *In vitro*, the flux of labeled salicylate from the mucosal to the serosal side of the tissue was measured before and after ascorbate was added to the serosal solution. Salicylate reached a new steady-state flux after ascorbate addition over a concentration range of 1-57 mM. The tissue permeability had a saturable dependence on ascorbate concentration. Ascorbate (6 mM) also

increased the short-circuit current by 13%, with onset immediately after ascorbate addition to the medium and with leveling to a constant value at 70 min. This stimulatory effect was essentially due to a decrease in tissue resistance, suggesting that the effect of ascorbate treatment on electrical properties is different from those of theophylline or ouabain. Similar results were obtained *in vivo*.

6586 INTESTINAL THIAMIN [sic] TRANSPORT: EFFECT OF CHRONIC ETHANOL ADMINISTRATION IN RATS. (Eng.) Hoyumpa, A. M., Jr.; Nichols, S.; Henderson, G. I.; Schenker, S. (Veterans Admin. Hosp., Nashville, TN 37203). *Am. J. Clin. Nutr.* 31(6):938-945; 1978.

The effect of chronic ethanol treatment on intestinal thiamine transport was studied in female Sprague-Dawley rats. The rats were fed the DeCarli-Lieber ethanol diet for 6 to 8 weeks, and ^{14}C-thiamine uptake and exit from enterocytes were measured in inverted gut sacs and correlated with basolateral membrane Na-K ATPase activity. The thiamine transport rate and Na-K ATPase activity were not affected in chronic ethanol-treated rats compared to pair-fed controls. Ethanol concentrations in gut lumen and plasma at the time of the study were 39.3 ± 15.3 and 40.2 ± 19.4 mg/100 ml, resp., although higher levels were noted at other times. Tissue thiamine pyrophosphate remained normal. In contrast, ethanol-treated rats given an extra dose of ethanol intragastrically (250 mg/100 g body weight) 1 hr before study showed a decrease in cellular exit of 0.2 and 0.5 μM thiamine to 44% and 56% of control, resp., ($p<0.025$) and of Na-K ATPase to 32% of control ($p<0.001$) when gut and plasma ethanol levels were 318.3 ± 38.7 and 185.0 ± 8.7 mg/100 ml, resp. These studies (a) confirm the inhibitory effect of ethanol on thiamine transport, (b) show that inhibition is dependent more on the ethanol concentration than on the duration of exposure to ethanol, and (c) suggest that thiamine malabsorption in this animal model may be intermittent. These findings may be relevant to the development of thiamine deficiency in alcoholics with periodic binge drinking.

6587 ASCORBIC ACID TRANSPORT IN ILEUM FOLLOWING DIET OF HIGH OR LOW ASCORBIC ACID CONTENT [Abstract]. (Eng.) Rose, R. C.; Nahrwold, D. L. (Pennsylvania State Univ. Coll. Medicine, Hershey, PA). *Gastroenterology* 72(5, Part 2):1122; 1977.

6588 INTESTINAL ABSORPTION OF ALANINE FROM DIPEPTIDE (Di-P) TRIPEPTIDE (Tri-P) AND TETRAPEPTIDE (Tetra-P) IN RAT [Abstract]. (Eng.) Chung, Y. C.; Kim, Y. S. (Veterans Admin. Hosp., San Francisco, CA). *Gastroenterology* 72(5, Part 2):1038; 1977.

6589 DUAL MECHANISM OF ASSIMILATION OF L-LEUCYL-L-LEUCINE (LEULEU) BY RAT SMALL INTESTINE [Abstract]. (Eng.) Rosen, E. M. (Stanford Univ., Stanford, CA 94305). *Gastroenterology* 72(5, Part 2):1188; 1977.

6590 DEVELOPMENT OF VALINE ABSORPTION IN THE SMALL INTESTINE OF RATS [Abstract]. (Eng.) Younoszai, M. K. (Univ. Iowa Hosp., Iowa City, IA). *Gastroenterology* 72(5, Part 2):1168; 1977.

6591 pH-VALUES IN THE SMALL INTESTINE OF RATS AND THEIR POSSIBLE ROLE IN THE ABSORPTION OF BILE ACIDS [Abstract]. (Eng.) Konder, H.; Haberich, F. J.; Stockert, H. G. (Institut fur Angewandte Physiologie, 3550 Marburg/Lahn, Lahnberge, W. Germany). *Pfluegers Arch.* 368(Suppl.):R20; 1977.

6592 THE EFFECT OF DIETARY FIBRE (GUAR GUM) ON CARBOHYDRATE ABSORPTION [Abstract]. (Eng.) Dilawari, J. B.; Leeds, A. R.; Gassull, M. A.; Haisiman, P.; Jenkins, D. J. A. (Central Middlesex Hosp., London NW10, England). *Gastroenterology* 72(5, Part 2):1049; 1977.

6593 EFFECT OF CELLULAR cAMP ON THE TRANSPORT OF SUGARS AND SODIUM BY THE JEJUNUM IN VIVO AND BY BRUSH BORDER VESICLES IN VITRO [Abstract]. (Eng.) Lucke, H.; Kinne, R.; Murer, H. (Max-Planck-Institut fur Biophysik, Kennedyallee 70, 6000 Frankfurt [Main], W. Germany). *Pfluegers Arch.* 368(Suppl.):R21; 1977.

6594 THE COTRANSPORT OF SUGAR AND SODIUM IN CHOLERA [Abstract]. (Eng.) Desjeux, J. F.; Dumontier, A. M.; Lestradet, H. (INSERM U-83, Hopital Herold, 75935 Paris, France). *Pediatr. Res.* 11(9):1029; 1977.

6595 TRH INHIBITS THE ABSORPTION OF GLUCOSE AND XYLOSE FROM THE GUT [Abstract]. (Eng.) Dolva, O.; Hanssen, K. F. (Aker Hosp., Oslo, Norway). *Acta Endocrinol. (Kbh.)* 85(Suppl. 212):194; 1977.

6596 DIURNAL RHYTHM OF GLYCINE ABSORPTION IN MAN--PROBABLY HORMONAL CONTROL [Abstract]. (Eng.) Butt, J.; Carpenter, M.; Parker, K. M.; Jacobs, L.; Durkin, M. (Harry S Truman Memorial Veterans Hosp., Columbia, MO). *Gastroenterology* 72(5, Part 2):1035; 1977.

6597 COMPARISON OF WATER AND ELECTROLYTE TRANSPORT IN THE SMALL INTESTINE OF SUCKLING(S)

AND ADOLESCENT (A) RATS [Abstract]. (Eng.) Laughlin, M. (Univ. Iowa Hosp., Iowa City, IA). *Gastroenterology* 72(5, Part 2):1190; 1977.

6598 OSMOTIC AND ELECTROLYTE CONCENTRATION GRADIENTS AND OSMOTIC DIARRHEA: IN VIVO STUDIES IN THE RAT [Abstract]. (Eng.) Hamburger, S. (Dept. Medicine, Univ. Iowa, Iowa City, IA). *Gastroenterology* 72(5, Part 2):1188; 1977.

See also, 6641, 6744, 6750, 6753, 6765, 6953, 7074.

MOTILITY

6599 RELATION BETWEEN VOLUME SWALLOWED AND VELOCITY OF THE BOLUS EJECTED FROM THE PHARYNX INTO THE ESOPHAGUS. (Eng.) Fisher, M. A.; Hendrix, T. R.; Hunt, J. N.; Murrills, A. J. (Guy's Hosp. Medical Sch., London, England). *Gastroenterology* 74(6):1238-1240; 1978.

The velocity of the front face of a liquid saline bolus ejected from the pharynx into the esophagus was measured by recording changes of luminal electrical impedance with three sets of electrodes in nine healthy subjects. At a site 26 cm from the incisors, the mean velocity of the front face of the bolus increased from 10 to 70 cm/sec as the volume swallowed was raised from 5 to 30 ml. The velocity of the front face of the bolus was greater 26 cm from the incisors than it was 32 cm from the incisors. These findings demonstrate that the greater the volume of the bolus, the greater the velocity of ejection.

6600 ALTERED LOWER ESOPHAGEAL SPHINCTER FUNCTION DURING EARLY PREGNANCY. (Eng.) Fisher, R. S.; Roberts, G. S.; Grabowski, C. J.; Cohen, S. (Temple Univ. Hosp., 3400 N. Broad St., Philadelphia, PA 19140). *Gastroenterology* 74(6): 1233-1237; 1978.

To determine whether lower esophageal sphincter (LES) function is normal during early pregnancy, studies were performed in eight pregnant women before and after abortion. Resting LES pressures were 22.1 ± 2.4 and 22.6 ± 2.3 mm Hg before and after abortion, resp. During early pregnancy, the LES pressure responses to pentagastrin (1.0 μg/kg) were inhibited significantly ($p<0.001$), compared with that 6 weeks after abortion. The LES responses to edrophonium and methacholine were decreased also ($p<0.02$ in both cases). LES pressure responses to a protein meal were diminished in an additional five pregnant women. Serum concentrations of estrogen and progesterone were elevated during pregnancy, but the serum concentration of gastrin was unchanged. It is concluded that, in early pregnancy, the basal LES pressure was within normal limits, but the LES pressure responses to hormonal, pharmacological, and physiological stimulation were reduced (during demonstrated elevations of serum concentrations of estrogen and progesterone). These studies suggest that during early pregnancy, when no clinical symptoms of reflux are present, altered LES function may be demonstrated.

6601 EFFECT OF INTRAGASTRIC BILE ON CANINE LOWER OESOPHAGEAL SPHINCTER PRESSURE. (Eng.) Laitinen, S.; Mokka, R. E. M.; Larmi, T. K. I. (Univ. Central Hosp., SF-90220, Oulu 22, Finland). *Scand. J. Gastroenterol.* 13(3):369-372; 1978.

A study was carried out to elucidate the immediate effect of intragastrically instilled bile on lower esophageal sphincter pressure (LESP) in the dog. Seven mongrel dogs were studied manometrically under thiopentone anesthesia. Resting LESP and intragastric pH were determined, after which 5 ml of fresh canine bile or of physiological saline (control) were instilled into the stomach and changes in LESP and intragastric pH were recorded for 1 hr. After bile instillation, LESP increased from 17.6 ± 2.3 to 26.4 ± 3.6 mm Hg ($p<0.01$) in 20 min and then gradually returned to the initial level by 60 min. The pH of the bile and saline were 7.7 ± 0.2 and 7.0 ± 0.1, resp. After bile instillation, intragastric pH rose from 2.7 ± 0.3 to 3.0 ± 0.4 and after saline instillation from 2.7 ± 0.3 to 3.0 ± 0.3. The results suggest that intragastric bile contamination, at least one of short duration, does not have any harmful effect on LESP competence and does not seem to predispose to gastroesophageal reflux in dogs.

6602 INDUCTION OF GASTRO-OESOPHAGEAL REFLUX BY ALCOHOL. (Eng.) Kaufman, S. E.; Kaye, M. D. (Univ. Vermont Coll. Medicine, Burlington, VT 05401). *Gut* 19(4):336-338; 1978.

To establish whether alcohol in amounts customarily imbibed during social drinking causes gastroesophageal reflux, 12 healthy young individuals, without symptoms of reflux, were studied twice. Each time, distal esophageal pH was monitored continuously for 3 hr after a standard meal that included either 180

ml of 100 proof vodka or 180 ml water. The order of studies with and without alcohol was random. Peak blood alcohol concentrations ranged between 0.63 and 1.29 g/l. Eleven of the 12 subjects refluxed more after alcohol ($p<0.0034$), and the difference in mean reflux scores for studies with and without alcohol was highly significant ($p<0.0005$). It is concluded that relatively modest quantities of alcohol induce gastroesophageal reflux.in healthy people.

6603 GASTRIC EMPTYING RATES OF SOLID FOOD IN RELATION TO BODY SIZE. (Eng.) Lavigne, M. E.; Wiley, Z. D.; Meyer, J. H.; Martin, P.; MacGregor, I. L. (Veterans Admin. Hosp., 4150 Clement St., San Francisco, CA 94121). *Gastroenterology* 74(6):1258-1260; 1978.

The relationship of body size to rates of gastric emptying of solid food was investigated in nine healthy men to obtain data that may allow this variable to be considered when populations of varying size are studied. Rates of gastric emptying were measured using a beef stew meal to which were added pieces of chicken liver tagged with ^{99m}Tc-sulfur colloid and by following the passage of the isotope through the gastrointestinal tract with intermittent γ-imaging. There was an inverse linear relationship between gastric emptying rates and body surface area, and between gastric emptying rates and body weight. The variable of body size must be taken into account when measurements of gastric emptying of solid food are measured.

6604 A UNIQUE DISTRIBUTION OF LAXATIVE-INDUCED SPIKE POTENTIALS FROM THE SMALL INTESTINE OF THE DOG. (Eng.) Atchison, W. D.; Stewart, J. J.; Bass, P. (Sch. Pharmacy, Center for Health Sciences, 425 North Charter St., Madison, WI 53706). *Am. J. Dig. Dis.* 23(6):513-520; 1978.

The effects of castor oil and ricinoleic acid on small bowel electrical activity were studied in fasted conscious dogs and were compared to the effects elicited by two nonlaxative oils (triolein and oleic acid) to determine the mechanism of castor oil and ricinoleic acid laxation. Spike potential activity was monitored at two jejunal sites using unipolar recording electrodes. Castor oil, ricinoleic acid, and triolein (all 40 ml) produced an increased incidence of basic electrical rhythm (BER, $p<0.05$) with associated spike potentials when compared to a fasted control; however, the total electrical spiking activity produced by these oils was not statistically different from that induced by feeding. No treatment altered any of the characteristics of BER. A novel pattern of electrical spiking activity was observed in response to the laxatives. This pattern consisted of short repetitive bursts of spike potentials that migrated the length of the recording site. The laxative-induced electrical pattern persisted for several days after treatment with ricinoleic acid or castor oil, and interdigestive patterns were occasionally interrupted for as long as 72 hr. Electrical activity following feeding or the nonlaxative oils consisted of random spike potentials, and normal interdigestive electrical activity resumed within 24 hr. The laxative-induced electrical pattern was quantitatively distinct from those produced by feeding, fasting, or nonlaxative oils. This pattern may reflect an action of these laxatives on intestinal motility during a diarrheal state.

6605 PHARMACOLOGIC ANALYSIS OF PENDULUM TYPE MOVEMENTS APPEARING DURING THE CALCIUM INDUCED BLOCKADE OF PERISTALSIS IN ISOLATED GUINEA PIG ILEUM. (Fre.) Beleslin, D. (Faculty Medicine, 11000 Beograd, C.P. 662, Yugoslavia). *C.R. Soc. Biol. (Paris)* 171(4):746-750; 1977.

Isolated guinea pig ileum preparations subjected to constant intraluminal pressure to induce peristalsis were then exposed to an excess of $CaCl_2$ on the serosal side to study the induced pendular movements. The Ca^{++} ions (9.1-36.0 mM) blocked the peristalsis, but after 30 min provoked pendulum-like movements (1-7/min) of the longitudinal muscle layer that lasted several hours. The addition of hexamethonium (>100 μg/ml), tetraethylammonium (>100 μg/ml), morphine (1-2 μg/ml), methadone (2-20 μg/ml), and atropine (1-10 ng/ml) to the serosal side blocked the movements, while neostigmine (0.025 μg/ml) potentiated them. From the action of these drugs, it can be concluded that the excess Ca^{++} ions induced the pendular movements by stimulating the postganglionic nerve endings in the longitudinal smooth muscle layer of isolated guinea pig ileum.

6606 PHARMACOLOGIC ANALYSIS OF PERISTALTIC BLOCKADE INDUCED BY THE ADDITION OF MAGNESIUM TO THE SEROSAL OR MUCOSAL SIDES OF ISOLATED GUINEA PIG ILEUM. (Fre.) Beleslin, D.; Samardzic, R. (Faculty Medicine, 11000 Beograd, C. P. 662, Yugoslavia). *C. R. Soc. Biol. (Paris)* 171(4):750-754; 1977.

The effect of various cholinergic drugs on isolated guinea pig ileum was studied after peristalsis had been blocked by magnesium to determine whether their effect is observed when they are applied to either the serosal or the mucosal side. The addition of acetylcholine (100-10,000 μg), metacholine (10-100 μg), eserine (2-20 μg), and neostigmine (5-25 μg) to the serosal side of the ileum antagonized the blocking effect of Mg^{++} ions (2.7-10.8 mM) previously applied to the mucosa. The same effect occurred when choline esters and anticholinesterases were injected intraluminally after the Mg^{++} ions were applied to the serosal side. Histamine (20-100 μg) and 5-hydroxytryptamine (2-200 μg) were not capable of removing the Mg^{++} ion block. These results indicate that cholinoceptive sites within the myenteric plexus, which initiate peristalsis when stimulated with cholinergics, are accessible from either side of the isolated ileum.

6607 STRICTLY ADDITIVE ANTISPASMODIC EFFECTS OF PAPAVERINE AND TIEMONIUM: AN EXAMPLE OF SEQUENTIAL BLOCKADE. (Fre.) Labrid, C.; Dureng, G.; Bert, H. (Laboratoire de Pharmacodynamie, C.E.R.M., 63203 Riom Cedex, France). *C.R. Soc. Biol. (Paris)* 171(4):764-770; 1977.

The effects of the antispasmodics tiemonium and/or papaverine were studied in isolated guinea pig ileum stimulated with $BaCl_2$ or histamine and in isolated rat jejunum stimulated with acetylcholine. When tiemonium was added to the preparations in various concentrations, its competitive antagonism was clearly demonstrated by the parallel shift to the right of the dose response curves compared to controls where only $BaCl_2$, histamine, or acetylcholine was used. The noncompetitive antagonism of papaverine was shown by a decrease in the maximal amplitude of the dose-response curves compared to controls. When both papaverine and tiemonium were used to inhibit the contracting agents, their effect was strictly additive, causing both a shift to the right and a decrease in amplitude. These results indicate a sequential blockade by papaverine and tiemonium on the cholinergic, histaminergic, and Ba^{++} ion receptors of smooth muscle tissue.

6608 ENHANCEMENT OF ELECTRICALLY STIMULATED GUINEA-PIG GALLBLADDER CONTRACTION BY SUBTHRESHOLD CONCENTRATIONS OF GASTROINTESTINAL HORMONES IN VITRO. (Eng.) Foesel, S.; Sewing, K. F. (Dept. Pharmacology, Univ. Tubingen, Wilhelmstrasse 56, D-7400 Tubingen, W. Germany). *Experientia* 34(2):5-6; 1978.

Experiments were carried out to investigate how subthreshold concentrations of cholecystokinin-octapeptide (CCK-OP), pentagastrin (PG), or secretin (S) influence the effects of transmural electrical stimulation (to mimic vagal excitation) on the isolated guinea pig gallbladder. A significant increase in gallbladder contraction in response to electrical stimulation was found after subthreshold concentrations of PG ($13\text{-}73 \times 10^{-9}$ M, $p<0.05$) and CCK-OP ($2\text{-}4 \times 10^{-11}$ M, $p<0.01$). The slight increase after secretin was not statistically significant. Since contractions of the gallbladder in response to both electrical stimulation and acetylcholine were blocked by atropine almost to the same extent, electrical stimulation could be regarded as an equivalent to vagal stimulation *in vivo*. Concentrations of PG and CCK-OP that alone do not contract the isolated guinea pig gallbladder after exposure of the organ to subthreshold concentrations of the hormones do enhance contraction in response to electrical stimulation. Thus, even on a subthreshold level, a synergistic action of hormonal stimulation with neural stimulation is possible. Circulating concentrations of CCK, which alone are inactive, may facilitate gallbladder contraction elicited by nervous excitation. This cooperative action could allow the neuroendocrine system to operate on a more economic level.

6609 INTRACELLULAR STUDY OF ELECTRICAL BEHAVIOR IN TONIC TYPE MYENTERIC NEURONS OF GUINEA PIG SMALL BOWEL [Abstract]. (Eng.) Wood, J. D.; Mayer, C. J. (Univ. Kansas Medical Center, Kansas City, KS 66103). *Fed. Proc.* 37(3):227; 1978.

6610 SIMULTANEOUS MEASUREMENT OF MECHANICAL AND INTRACELLULAR ELECTRICAL ACTIVITY OF CANINE CORPORAL SMOOTH MUSCLE: EFFECTS OF ACETYLCHOLINE AND POTASSIUM [Abstract]. (Eng.) Morgan, K. G.; Szurszewski, J. H. (Mayo Medical Sch., Rochester, MN 55901). *Fed. Proc.* 37(3):227; 1978.

6611 EFFECTS OF MORPHINE SULFATE ON MOTILITY OF THE SMALL INTESTINE [Abstract]. (Eng.) Sussman, S. E.; Stewart, J. J.; Burks, T. F.; Weisbrodt, N. W. (Univ. Texas Medical Sch., Houston, TX 77030). *Fed. Proc.* 37(3):640; 1978.

6612 COMPARISON OF THE MECHANICAL PROPERTIES OF THE PROXIMAL AND DISTAL COLON OF THE RABBIT [Abstract]. (Eng.) Tucker, H. J.; Snape, W. J., Jr.; Cohen, S. (Univ. Pennsylvania, Philadelphia, PA 19104). *Fed. Proc.* 37(3):640; 1978.

6613 INHIBITION OF GASTRIC MOTILITY IN TURKEYS BY AVIAN PANCREATIC POLYPEPTIDE (APP) [Abstract]. (Eng.) Duke, G. E.; Kimmel, J. R. (Coll. Veterinary Medicine, Univ. Minnesota, St. Paul, MN 55108). *Fed. Proc.* 37(3):373; 1978.

6614 MECHANICAL RESPONSES OF CANINE GASTRIC ANTRUM TO CHOLECYSTOKININ VARIANT [Abstract]. (Eng.) Schmalz, P. F.; Go, V. L. W.; Beeler, G. W.; Szurszewski, J. H. (Mayo Medical Sch., Rochester, MN 55901). *Fed. Proc.* 37(3):373; 1978.

6615 ANALYSIS OF MECHANICAL FACTORS IN GASTRO-ESOPHAGEAL COMPETENCE [Abstract]. (Eng.) Bryant, G. H.; DeMeester, T. R. (Tripler Army Medical Center, Honolulu, HI 96859). *Fed. Proc.* 37(3):483; 1978.

6616 NEUROHUMORAL, HORMONAL, AND DRUG RECEPTORS FOR THE LOWER ESOPHAGEAL SPHINCTER. (Eng.) Goyal, R. K.; Rattan, S. (Univ. Texas Health Science Center at Dallas, 5323 Harry Hines Blvd., Dallas, TX 75235). *Gastroenterology* 74(3):598-619; 1978.

See also, 6575, 6576, 6578, 6579, 6762, 6764, 6768, 6769, 6781, 6813, 6814, 6828, 6851, 6852.

6617 REGIONAL DISTRIBUTION OF PROSTAGLANDIN-METABOLIZING ENZYMES IN THE MUCOSA OF THE HUMAN UPPER GASTROINTESTINAL TRACT. (Eng.) Peskar, B. M. (Medizinische Klinik, Univ. Freiburg, 7800 Freiburg i. Br., W. Germany). *Acta Hepatogastroenterol. (Stuttg.)* 25(1):49-51; 1978.

To compare the specific activities of the prostaglandin (PG)-metabolizing enzymes 15-hydroxy-PG-dehydrogenase (15-HPGDH), $^{13}\Delta$-reductase (DR), and PG E-9-keto-reductase (PGEKR) in various regions of the human upper gastrointestinal tract, four to six mucosal biopsy specimens were obtained from each of 34 patients undergoing diagnostic endoscopy. Only macroscopically normal tissue was used, and the absence of pathological changes was confirmed histologically. Specimens from the esophagus, gastric fundus, gastric corpus, gastric antrum, and duodenum were analyzed. All three enzymes were found in all regions of the gastrointestinal tract examined, the 15-HPGDH specific activity being highest in every region and the PGEKR specific activity being the lowest. Variations from region to region in the activity of any enzyme were quite small. However, 15-HPGDH activity was significantly lower ($p<0.05$) in the esophagus than in the duodenum; the activity of PGEKR was significantly higher in the duodenum than in the gastric corpus ($p<0.01$), the gastric fundus ($p<0.001$), or the esophagus ($p<0.005$) and significantly lower ($p<0.005$) in the gastric fundus than in the esophagus. The results indicate that control of the biological activity of PGs in the human gastrointestinal tract by enzymatic inactivation is not restricted to only some regions, which suggests a fundamental function of endogenous PGs in the gastrointestinal tract.

6618 THE ROLE OF Ca^{2+} AND Na^{+} IN SECRETORY PROCESSES CONTROLLED BY CHOLINERGIC AND ADRENERGIC AGONISTS IN RAT PAROTID GLANDS [Abstract]. (Eng.) Keryer, G.; Herman, G.; Rossignol, B. (Institut de Biochimie, Universite de Paris-Sud, 91405 Orsay Cedex, France). *Ir. J. Med. Sci.* 146(Suppl. 1):7; 1977.

6619 THE CONTROL OF SUBMAXILLARY GLAND MUCIN PRODUCTION. (Eng.) Phelps, C. F.; Young, A. M. (Dept. Biological Sciences, Univ. Lancaster, Lancaster, LA1 4YQ, England). *Adv. Exp. Med. Biol.* 89:143-154; 1977.

6620 CHEMISTRY AND BIOSYNTHESIS OF MUCIN GLYCOPROTEINS. (Eng.) Carlson, D. M. (Dept. Biochemistry, Purdue Univ., West Lafayette, IN 47907). *Adv. Exp. Med. Biol.* 89:251-273; 1977.

6621 SYNTHESIS AND EXCRETION OF BILE ACID SULFATE ESTERS IN THE ISOLATED PERFUSED RAT KIDNEY. (Eng.) Czygan, P.; Ast, E.; Frohling, W.; Stiehl, A.; Kommerell, B. *In: Bile Acid Metabolism in Health and Disease. Proceedings of the IV Bile Acid Meeting Held at the Hilton Hotel, Basel, Switzerland, October 11-12, 1976.* (Baltimore: University Park Press): 83-87; 1977.

6622 RENAL MECHANISMS INFLUENCING THE BILE ACID COMPOSITION OF CHOLESTATIC URINE. (Eng.) Barnes, S.; Summerfield, J. A.; Gollan, J. L.; Billing, B. H. *In: Bile Acid Metabolism in Health and Disease. Proceedings of the IV Bile Acid Meeting Held at the Hilton Hotel, Basel, Switzerland, October 11-12, 1976.* (Baltimore: University Park Press): 89-92; 1977.

See also, 6568, 6574, 6785, 6795, 6848, 6852, 7029, 7044.

Stomach

6623 GASTRIN IN THE HUMAN FETUS: DISTRIBUTION AND MOLECULAR FORMS OF GASTRIN IN THE ANTRO-PYLORIC GLAND AREA, DUODENUM AND PANCREAS. (Eng.) Larsson, L. I.; Rehfeld, J. F.; Goltermann, N. (Inst. Medical Biochemistry, Univ. Aarhus, DK-8000 Aarhus C, Denmark). *Scand. J. Gastroenterol.* 12(7):869-872; 1977.

Evidence that neonatal and fetal gastrin is secreted into the blood stream prompted an immunocytochemical and radioimmunochemical evaluation of the development of gastrin in the antrum, duodenum, and pancreas in 11- to 12-week-old fetuses. Pancreatic gastrin was not detected at any of the ages studied. Antral gastrin cells were numerous only in fetuses older than 19 weeks, whereas many strongly immunoreactive gastrin cells were detected in the duodenum of all fetuses. Gastrin component III was found to predominate in the antrum, whereas component II was quantitatively very important in the duodenum. Component I was detected in most extracts of both antrum and duodenum. These observations, together

with those reported in animals, suggest that fetal gastrin is delivered to the blood, and that it may exert trophic functions in the fetus.

6624 FASTING AND POSTPRANDIAL SERUM GASTRIN IN NORMAL HUMAN NEONATES. (Eng.) Rodgers, B. M.; Dix, P. M.; Talbert, J. L.; McGuigan, J. E. (Box J-286, JHMHC, Gainesville, FL 32610). *J. Pediatr. Surg.* 13(1):13-16; 1978.

To elucidate information concerning the mechanisms involved in the initiation and regulation of the secretion of gastric acid in the neonate, the levels of gastrin in the blood of normal fasting newborn infants and the alterations in the serum gastrin levels elicited by normal feeding in the first 3 days of life were measured. In 13 infants for whom both maternal venous and umbilical cord venous samples were available, the average gastrin concentration was 92 pg/ml (range 17-183 pg/ml) in the maternal sample but 130 pg/ml (range 39-233 pg/ml) in the cord sample ($p<0.057$). In 22 fasting infants, the average peripheral venous gastrin concentration was 155 pg/ml (range 53-286 pg/ml), which was a significant ($p<0.006$) elevation over the 3- to 5-hr period since birth when the cord venous average gastrin value was 111 pg/ml (range 39-233 pg/ml). In 20 infants, the average fasting serum gastrin concentration was 151 pg/ml (range 31-286 pg/ml) prior to the first feeding, whereas it rose significantly ($p<0.034$) over the 60-hr period prior to the last hospital feeding (to 195 pg/ml, range 49-347 pg/ml). In comparing pre- and postprandial concentrations of serum gastrin, no significant differences were detected between breast- and bottle-fed infants. In 26 infants analyzed at the initial feeding and 14 analyzed at the final feeding, the increase in average serum gastrin concentration 30 min after feeding was not significant. These data support the hypothesis that the human neonate is capable of active gastrin secretion in the first few days of life. The absence of significant elevations in postprandial serum gastrin concentrations suggests the possibility of a relatively immature antral gastrin release mechanism in the newborn human infant.

6625 THE INFLUENCE OF GASTRIN ON PLASMA CALCIUM, BILE AND GASTRIC CALCIUM SECRETIONS IN THE RAT. (Eng.) Krishnamra, N.; Limlomwongse, L. (Dept. Physiology, Mahidol Univ., Bangkok 4, Thailand). *Proc. Soc. Exp. Biol. Med.* 158(1):40-44; 1978.

The influence of gastrin on Ca homeostasis was investigated in anesthetized female Fisher rats. When administered i.p., gastrin (50 µg/g) was found to lower the plasma Ca concentration in both intact rats ($p<0.01$) and thyroparathyroidectomized rats ($p<0.5$) but to exert no significant effect on the rates of urine Ca excretion in the intact rats. Thus, the hypocalcemic effect of gastrin is independent of calcitonin. In search of possible routes of Ca removal from the blood, both the Ca concentration in gastric juice and the total gastric Ca excretion were measured. Total gastric calcium excretion was increased from 14 ± 1.4 to 22 ± 2.4 µg/hr/100 g by the administration of gastrin. The increase in gastric Ca secretion and the hypocalcemic effect were abolished by concurrent administration of secretin (2 U). The bile volume and the Ca content in the bile secretion were not affected by gastrin. These findings were compatible with the hypothesis that the hypocalcemic effect of gastrin was partly caused by an increased Ca excretion into the gastrointestinal lumen.

6626 SELECTIVE RELEASE OF GASTRIC INHIBITORY POLYPEPTIDE BY INTRADUODENAL AMINO ACID PERFUSION IN MAN. (Eng.) Thomas, F. B.; Sinar, D.; Mazzaferri, E. L.; Cataland, S.; Mekhjian, H. S.; Caldwell, J. H.; *et al.* (Ohio State Univ. Hosp., 410 W. 10th Ave., Columbus, OH 43210). *Gastroenterology* 74(6):1261-1265; 1978.

To determine whether different groups of amino acids are more potent stimulators of gastric inhibitory polypeptide, 12 normal subjects received an intraduodenal perfusion of a mixed amino acid solution (158 mM) containing either methionine, phenylalanine, tryptophan, and valine (perfusate 1), or an amino acid solution containing arginine, histidine, isoleucine, leucine, lysine, and threonine (perfusate 2). Serum concentrations of gastric inhibitory polypeptide and insulin were significantly greater in the group receiving perfusate 2 ($p<0.001$). In contrast, after administration of amino acid perfusate 1, there was only a slight increase in serum gastric inhibitory polypeptide concentration, and insulin secretion increased only slightly. Mean trypsin and bilirubin outputs in the group receiving perfusate 1 were nearly 3 times greater than the outputs of the group receiving the other amino acid mixture. This study expands the importance of intraduodenal amino acid mixtures in stimulating secretion of gastric inhibitory polypeptide and insulin and quantitatively separates gastric inhibitory polypeptide release from release of hormones that stimulate pancreatic enzyme secretion, such as cholecystokinin.

6627 INHIBITORY ROLE OF THE DISTAL SMALL INTESTINE ON THE GASTRIC SECRETORY RESPONSE TO MEALS IN MAN. (Eng.) Clain, J. E.; Go, V. L. W.; Malagelada, J. R. (Mayo Clinic, Rochester, MN 55901). *Gastroenterology* 74(4):704-707; 1978.

The role of the distal small intestine in postprandial gastric function was investigated in six healthy subjects by diverting chyme from the intestine at a site 100 cm distal to the ligament of Treitz and comparing the results with those observed in the same subjects when chyme was exposed to the entire gut. Diversion of chyme significantly increased ($p<0.02$) gastric secretory volume and acid output during the first postprandial hour by an average of 78% and 70%, resp.; the increase in acid output during ileal diversion occurred during the first postprandial hour in every subject studied. The pH of the gastric contents in the diversion studies was consistently lower than that in the chyme exposed to the entire gut ($p<0.01$) between 20 min and 4 hr postprandially. The increased secretory volume and

acid output in the first postprandial hour resulted in greater intragastric volume ($p<0.01$) and acid content ($p<0.05$) throughout the study period, whereas emptying of gastric contents and acid was similar in the control and diversion experiments. The results demonstrate that the distal small intestine has an inhibitory role in postprandial gastric secretion.

6628 CELLULAR MECHANISMS OF GASTRIC HYPERSECRETION IN PYLORUS-LIGATED RATS. (Eng.) Mozsik, G.; Beck, Z.; Fuzesi, Z.; Kiss, J.; Nagy, L.; Palotai, Z.; *et al.* (Univ. Medical Sch., H-7643 Pecs, Hungary). *Acta Physiol. Scand.* (Suppl.):187-198; 1978.

The effects of epinephrine, theophylline, Degranol®, actinomycin D, tetracycline, ATP, ADP, AMP, cyclic 2'3'-AMP, and cyclic 3'5'-AMP (cAMP) on the gastric secretory responses of pylorus-ligated rats were studied to determine cellular mechanisms of gastric hypersecretion. The tissue levels of mucosal ATP, ADP, AMP, cAMP, lactate, and pyruvate were measured. Gastric hypersecretion in pylorus-ligated rats was inhibited dose-dependently by epinephrine, theophylline, Degranol®, actinomycin D, tetracycline, ADP, AMP, cyclic 2'3'-AMP, and cAMP. The plasma immunoreactive gastrin level did not change at different times (2, 4, 7, and 16 hr) after pylorus ligation. The tissue contents of ATP, cAMP, and lactate were significantly decreased within 2-4 hr after pylorus ligation ($p<0.001$), while the tissue levels of ADP and AMP significantly increased in that time ($p<0.001$). The increased tissue level of mucosal ADP was prevented by atropine, epinephrine, atropine plus theophylline, epinephrine plus theophylline, and histamine. The decreased mucosal level of cAMP that occurred within 4 hr after pylorus-ligation was elevated by theophylline, epinephrine, atropine plus theophylline, and epinephrine plus theophylline, but not by histamine or histamine plus theophylline. It is concluded that (1) an increase in DNA-dependent RNA synthesis, *de novo* DNA synthesis, and protein translation are needed for the development of gastric hypersecretion, (2) gastric hypersecretion in pylorus-ligated rats is an ATP-dependent process, and (3) the development of gastric hypersecretion is associated with an increase in ATP transformation to ADP and with a decrease in ATP transformation to cAMP. The blockage of gastric hypersecretion is therefore associated with a decrease in ATP transformation to ADP and with an increase in ATP transformation to cAMP. It is postulated that an extra- and intracellular feedback mechanism system exists between the ATP-ADP (membrane ATPase) system and the ATP-cAMP (adenylate cyclase) system of the gastric mucosa.

6629 EFFECT OF HISTAMINE H_1- AND H_2-RECEPTOR BLOCKADE ON CANINE GASTRIC ACID SECRETION. (Eng.) Barbezat, G. O.; Bowey, F. S. B.; Kaplan, E. R.; Hickman, R. (Groote Schuur Hosp., Observatory, 7925, Cape Town, South Africa). *Am. J. Dig. Dis.* 23(3):222-224; 1978.

To unmask any H_1-receptor sites on parietal cells, a study was carried out to determine whether simultaneous administration of histamine H_1- and H_2-receptor antagonists had any greater effect on histamine-stimulated gastric secretion in the dog than did either of these substances given alone. Two dogs with gastric fistulae and Heidenhain pouches given only fluids for 18 hr received histamine (160 µg/kg/hr, i.v., by continuous infusion) throughout all tests. After 1.5 hr, a bolus injection of mepyramine (25 mg), metiamide (0.6 mg/kg), mepyramine and metiamide together (same doses), or saline (control) was given; six studies were done with each dose at least 72 hr apart. Secretions were collected every 15 min for 2 hr. Metiamide (an H_2-receptor antagonist) significantly inhibited histamine-stimulated gastric secretion in both the gastric fistula ($p<0.01$) and Heidenhain pouch ($p<0.001$). Mepyramine (an H_1-receptor antagonist) had no significant effect on gastric secretion either alone or in combination with metiamide. Two dogs with gastric fistulas received either mepyramine (25 mg, i.v., as a bolus followed by 12.5 mg over 250 min), metiamide (0.6 mg/kg/hr), mepyramine plus metiamide in the same doses, or saline. After 10 min, an i.v. histamine infusion was begun and the dose doubled every 40 min (10, 20, 40, 80, 160, and 320 µg/kg/hr). The dose-response curve of inhibition by metiamide and mepyramine was virtually superimposable on that for metiamide alone, confirming the results of the first study. The inhibition by metiamide appeared to be competitive. There is no evidence in these studies for the presence of histamine H_1-receptor sites on the gastric parietal cell.

6630 BIOAVAILABILITY OF CIMETIDINE IN MAN. (Eng.) Walkenstein, S. S.; Dubb, J. W.; Randolph, W. C.; Westlake, W. J.; Stote, R. M.; Intoccia, A. P. (Smith Kline Corporation, 1500 Spring Garden St., Philadelphia, PA 19101). *Gastroenterology* 74(2):360-365; 1978.

The bioavailability of parenteral cimetidine was tested in 12 volunteers in a balanced three-way crossover study. Blood levels and urinary excretion were compared after i.m., i.v., and p.o. administration of 300 mg of cimetidine. The i.m. and i.v. routes were found to be virtually interchangeable for parenteral cimetidine. The p.o. liquid, although exhibiting a reduced area under the blood level curve as compared with the parenteral doses, nevertheless demonstrated equivalence with respect to the time the blood level remained above 0.5 µg/ml. In another group of 12 volunteers the 300-mg cimetidine tablet formulation was found to be bioequivalent to a 300-mg dose of p.o. liquid.

6631 EFFECT OF CIMETIDINE ON INTRINSIC FACTOR AND PEPSIN SECRETION IN MAN. (Eng.) Binder, H. J.; Donaldson, R. M., Jr. (Yale Univ. Sch. Medicine, 333 Cedar St., New Haven, CT 06510). *Gastroenterology* 74(2, Part 2):371-375; 1978.

The effect of two doses of cimetidine on betazole-

stimulated gastric acid, pepsin, and intrinsic factor secretions was evaluated in 15 normal men. The p.o. administration of 300 mg of cimetidine resulted in significant decreases in betazole (1.5 mg/kg)-stimulated volume secretion ($p<0.05$), acid concentration ($p<0.001$), gastric acid output ($p<0.001$), and pepsin output ($p<0.01$), and it completely inhibited the increase in pepsin concentration, intrinsic factor concentration, and intrinsic factor output caused by betazole. A 200-mg cimetidine dose significantly inhibited gastric volume secretion ($p<0.05$), intrinsic factor output ($p<0.01$), gastric acid output ($p<0.02$), and pepsin output ($p<0.05$); the change in gastric acid output was not evident until 45 min after betazole administration, and the change in pepsin output was only seen during the last 45 min of observation. The diminished pepsin secretion observed with cimetidine may be merely a consequence of diminished acid secretion. Because this drug inhibits betazole-stimulated intrinsic factor secretion, and, in at least one previous study, pentagastrin-stimulated intrinsic factor secretion, it may be important to monitor the long-term effects of this agent on intrinsic factor production and on vitamin B_{12} absorption.

6632 EFFECT OF CIMETIDINE ON GASTRIC SECRETORY FUNCTION DURING STRESS. (Eng.) Levine, B. A.; Sirinek, K. R.; Teegarden, D. K.; McLeod, C. G.; Pruitt, B. A. (U.S. Army Inst. Surgical Res., Fort Sam Houston, TX 78234). *J. Surg. Res.* 24(3): 178-181; 1978.

Cannulated female C-D rats were divided into two groups, stress (30 animals) and no stress (24 animals), each of which were subdivided equally into cimetidine-treated (20 mg/kg, i.p.) and control (saline-treated) subgroups to define the effect of cimetidine on gastric acid production in this awake model previously shown to produce acute, stress-related, gastric mucosal injury. Gastric secretions were collected for 4 hr in each group. Cimetidine significantly reduced the mean volume of gastric juice in nonstressed rats (from 0.72 ± 0.07 ml/hr in controls to 0.44 ± 0.03 ml/hr, $p<0.01$), but there was no significant difference in gastric output volume between control and cimetidine-treated stressed rats (0.32 ± 0.04 and 0.42 ± 0.04 ml/hr, resp.). Cimetidine significantly reduced gastric acid concentration in both the stressed (from 57.17 ± 6.56 to 17.29 ± 1.94 mEq/l, $p<0.01$, for controls and cimetidine-treated rats, resp.) and nonstressed groups (from 63.38 ± 3.68 to 50.80 ± 3.90 mEq/l, $p<0.05$). Cimetidine significantly reduced total acid output from that in control animals in both trials (from 47.22 ± 6.39 to 23.42 ± 2.82 μEq/hr, $p<0.01$, in unstressed rats, and from 18.54 ± 3.41 to 7.80 ± 3.37 μEq/hr, $p<0.01$, in stressed rats). Total acid output in the stressed control rats was significantly lower than in nonstressed controls ($p<0.01$), but unchanged from that seen in the unstressed cimetidine group. It is concluded that gastric acid concentration is more important than total acid output in formation of stress-related gastric mucosal injury and that cimetidine's protective role in stress is related to its ability to decrease gastric acid concentration.

6633 THE EFFECTS OF CIMETIDINE ON HEALING OF CHRONIC GASTRIC AND DUODENAL ULCERS IN DOGS. (Eng.) Okabe, S.; Takeuchi, K.; Murata, T.; Urushidani, T. (Kyoto Coll. Pharmacy, 5 Goryo Nakauchi, Yamashina, Kyoto 607, Japan). *Am. J. Dig. Dis.* 23(2):166-168; 1978.

Studies were carried out to confirm previous reports that cimetidine accelerates healing of chronic gastric and duodenal ulcers. Gastric ulcers were produced in dogs by the subserosal injection of acetic acid solution and duodenal ulcers by topical application of acetic acid on the serosal surface of the duodenum. The dogs received cimetidine p.o. (450 mg/day) in three divided doses for 14 days. Although cimetidine had no significant effect on gastric ulcer healing, it produced a remarkable acceleration of healing of duodenal ulcers, compared with that in untreated controls ($p<0.001$). An apparent and relatively deep ulcer was observed in all 10 nontreated controls, whereas 4 of 10 treated dogs had a completely healed duodenal ulcer. These studies demonstrate that cimetidine treatment markedly accelerates duodenal ulcer healing.

6634 METIAMIDE: MORE THAN AN H_2-RECEPTOR ANTAGONIST. (Eng.) Simay, D. A.; Peskin, G. W.; Saik, R. P. (Veterans Admin. Hosp., La Jolla Village Drive, San Diego, CA 92161). *Am. J. Dig. Dis.* 23(2):169-172; 1978.

To investigate the mechanism of action of metiamide on acid secretion, the effect of this drug on acid secretion and calcium uptake by the frog gastric mucosa was tested alone and in combination with histamine, pentagastrin, aminophylline, and dibutyrl cyclic AMP (db cAMP). Although metiamide (10^{-4} M) reduced the acid secretory rate stimulated by 5×10^{-5} M and 10^{-3} M histamine, the percent increase at the lower dose of histamine was not significantly different from that in the controls. This inhibition by metiamide of the lower dose of histamine was overcome by increasing the histamine concentration, suggesting that metiamide is an H_2-receptor antagonist with competitive dynamics. Pentagastrin, on a molar comparative basis, was a more potent stimulant of acid secretion than was histamine, causing a 178.9% increase at 2×10^{-6} M, suggesting that a separate receptor site is involved in pentagastrin-induced acid stimulation. Aminophylline (10^{-3} M) and db cAMP (10^{-3} M) stimulated acid secretion by 340.7% and 314.6%, resp. Metiamide inhibited acid secretion by both aminophylline (-12.1% at 10^{-3} M and -7.8% at 2×10^{-2} M aminophylline, not significant) and by db cAMP (-37.9% at 10^{-3} M, $p<0.05$), suggesting that metiamide is more than an H_2 blocker. Since these agents stimulate intracellularly, at a site beyond the adenylate cyclase membrane receptor complexes, it appears that metiamide also inhibits actively within the cell. Metiamide inhibition was overcome by markedly increasing the dose of db cAMP to 8×10^{-3} M. Calcium influx was increased by histamine, pentagastrin, and aminophylline administration to the same degree. Although db cAMP increased acid secretion, it did not increase calcium influx, suggesting that increased cellular activity alone is not the cause of calcium uptake. Metia-

mide, even while inhibiting acid secretion, caused a significant increase in Ca^{2+} uptake as well ($p<0.005$). Metiamide caused increases in stimulated Ca^{2+} uptake into the parietal cell. The results suggest that metiamide actively inhibits acid secretion at a point within the cell beyond the adenylate cyclase membrane receptor complexes. Its effect on calcium influx may be another mechanism of inhibition.

6635 CANCER RISK OF THE STOMACH RESECTED FOR ULCER. THE ROLE OF DUODENOGASTRIC REFLUX IN DIFFERENT GASTROENTERAL ANASTOMOSES. (Ger.) Dahm, K.; Eichen, R.; Mitschke, H. (Abteilung Allgemeinchirurgie, Chirurgische Universitatsklinik, Martinistr. 52, D-2000 Hamburg 20, W. Germany). *Langenbecks Arch. Chir.* 344(2):71-82; 1977.

The effect of duodenogastric reflux on the carcinogenic activity of orally administered *N*-methyl-*N'*-nitro-*N*-nitrosoguanidine (NG, 120 mg/l in drinking water) was studied in male Wistar rats. Gastric resection with short-loop gastroenteric anastomosis (Billroth II) was prepared in 39 rats (group 1); this anastomosis provided for continuous duodenogastric reflux. Gastric resection with Roux-en-Y anastomosis was performed in 33 rats (group 2); this anastomosis caused the passage of bile and pancreatic juice into the jejunum without its coming into contact with the remaining part of the stomach. From the eighth postoperative week onward, the animals received drinking water with NG *ad libitum* and were sacrificed after 8.5 months. The incidence of tumors in the anastomosis region was 13/39 in group 1, 7/33 in group 2, and 5/27 in the nonoperated controls. The incidence of carcinomas was 11/39 in group 1, 7/33 in group 2, and 0/27 in the controls. Sarcomas were found in two animals in group 1 and in one control animal. Carcinomas of the anastomosis were found in 7/39 animals in group 1 and in 1/33 in group 2. Carcinomas of the small intestine were found in four and six animals in groups 1 and 2, resp. The findings indicate the substantial contribution of duodenogastric reflux to the development of carcinoma of the resected stomach.

6636 LYSINE ACETYLISALICYLATE INHIBITS THE PROTEIN SYNTHESIS IN THE RAT GASTRIC MUCOSA IN VIVO AND IN VITRO. (Eng.) Pichl, J.; Mitznegg, P.; Subramanian, N.; Sprugel, W.; Domschke, W.; Estler, C. J. (Institut fur Pharmakologie und Toxikologie der Universitat Erlangen-Nurnberg, Universitatsstr. 22, D-8520 Erlangen, W. Germany). *Acta Hepatogastroenterol. (Stuttg.)* 25(1):52-54; 1978.

To elucidate a possible mechanism for the side-effects of lysine acetylsalicylate (LAS), the action of s.c.-administered LAS on protein synthesis of various organs was investigated in the rat, and to discriminate between direct and indirect actions of LAS, similar investigations on protein and nucleic acid synthesis were performed in isolated rat gastric mucosal tissue. Male Wistar rats that were starved for 24 hr received LAS (90-900 mg/kg, s.c.) and were killed 30 min or 2 hr later. Gastric mucosal protein synthesis was significantly ($p<0.001$) inhibited 30 min after a 90-mg/kg LAS dose, whereas the incorporation of ^{14}C-labeled precursors into tissue proteins in the duodenum and liver (997 ± 56 counts/min [cpm]/mg protein and 160 ± 21 cpm/mg protein, resp.) were not significantly different after the 900-mg/kg LAS dose from control values (1,014 ± 55 and 153 ± 13 cpm/mg protein, resp.). The incorporation of ^{14}C-labeled precursors into protein, ^{3}H-thymidine into DNA, and ^{14}C-orotic acid into RNA were studied in an *in vitro* preparation of gastric mucosa in the presence of 0.9-9 mg/ml LAS. LAS inhibited protein synthesis in a dose-dependent manner, but the values for ^{3}H-thymidine and ^{14}C-orotic acid incorporation were not different from control values. It is possible that the inhibition of translation by LAS could contribute to the potential ulcerogenic effect of acetylsalicylate and that parenteral administration of LAS would not protect the stomach from salicylate-induced side-effects.

6637 EFFECT OF n-METHYL-n'-NITRO-n-NITROSOGUANIDINE ON THE GASTRIC MUCOSAL BARRIER IN RATS. (Eng.) Horowitz, I.; Toth, L. S.; Werther, J. L. (Mount Sinai Sch. Medicine, City Univ. New York, New York, NY 10029). *Am. J. Dig. Dis.* 23(6):510-512; 1978.

In the light of studies showing microscopic evidence of early inflammatory gastric mucosal damage after *N*-methyl-*N'*-nitro-*N*-nitrosoguanidine (MNNG) prior to the development of carcinoma, the gastric mucosal barrier to hydrogen ion (H^+) after MNNG administration in the rat stomach was studied. Increased H^+ back-diffusion was observed 3 hr after p.o. doses of 1 mg of MNNG over a 3-day period. MNNG in concentrations of 250 μg/ml, 167 μg/ml, 86 μg/ml, and 50 μg/ml in the presence of acid caused increased H^+ back-diffusion across the gastric mucosa within 1 hr. Gastric mucosal barrier disruption by MNNG may play a pathogenic role in gastric carcinogenesis.

6638 THE RATE OF GASTRIC SECRETION OF HYDROGEN IONS. (Rus.) Kanishchev, P. A.; Kovalenko, L. G. (Dnepropetrovsk Scientific Res. Inst. Gastroenterology, Dnepropetrovsk, USSR). *Lab. Delo* (12):707-712; 1977.

6639 THE ASSESSMENT OF THE ANTIPEPTIC EFFECT OF ULCER THERAPY. (Eng.) Massewitsch, C.; Gorschkow, W. (Inst. Gastroenterology, Orbeli 22-21, Leningrad K223, USSR). *Acta Hepatogastroenterol. (Stuttg.)* 24(6):452-455; 1977.

6640 PROPHYLACTIC EFFECT OF SOMATOSTATIN ON STRESS ULCER FORMATION IN RATS. (Eng.) Zierden, E.; Hengst, K.; Hossdorf, Th.; Wagner, H.; Gerlach, U. (Medical Clinic and Polyclinic, Univ. Munster, Westring 15, 4400 Munster/Westf., W. Germany). *Acta Hepatogastroenterol. (Stuttg.)* 24(6):447-451; 1977.

6641 H^+ TRANSPORT BY A NON-ELECTROGENIC GASTRIC•ATPase AS A MODEL FOR ACID SECRETION. (Eng.) Sachs, G. (Lab. Membrane Biology, Univ. Alabama in Birmingham, Birmingham, AL). *Rev. Physiol. Biochem. Pharmacol.* 79:133-162; 1977.

6642 ULTRASTRUCTURAL CHANGES AND CYCLIC AMP IN FROG OXYNTIC CELLS. (Eng.) Carlisle, K. S.; Chew, C. S.; Hersey, S. J. (Dept. Physiology, Emory Univ., Atlanta, GA 30322). *J. Cell. Biol.* 76(1):31-42; 1978.

6643 HYPERPLASIA OF SIMILAR AND DISSIMILAR MUCOSA ADJOINING GASTRIC MUCOSAL WOUNDS IN THE RAT. (Eng.) Wong, J.; Finckh, E. S. (Queen Mary Hosp., Hong Kong). *Pathology* 9(3):243-250; 1977.

6644 STEREOMICROSCOPIC AND ULTRASTRUCTURAL CHARACTERIZATION OF PROPIONITRILE-INDUCED DUODENAL ULCER IN THE RAT. (Eng.) Giampaolo, C.; Poulsen, S. S.; Szabo, S.; Reynolds, E. S.; Feldman, D. (Peter Bent Brigham Hosp., 721 Huntington Ave., Boston, MA 02115). *Lab. Invest.* 38(1):1-7; 1978.

6645 HISTAMINE H_2-RECEPTOR ANTAGONISTS. (Eng.) Feldman, M.; Richardson, C. T. (Univ. Texas Southwestern Medical Sch., Dallas, TX). *Adv. Intern. Med.* 23:1-24; 1978.

6646 DOES INCREASED GASTRIC MUCUS PLAY A ROLE IN THE ULCER-PROTECTING EFFECTS OF ZINC SULPHATE? (Eng.) Cho, C. H.; Ogle, C. W. (Faculty Medicine, Univ. Hong Kong, 5, Sassoon Rd., Hong Kong). *Experientia* 34(1):90-91; 1978.

6647 ACCUMULATION OF 2-μm LATEX PARTICLES IN MOUSE PEYER'S PATCHES DURING CHRONIC LATEX FEEDING. (Eng.) LeFevre, M. E.; Vanderhoff, J. W.; Laissue, J. A.; Joel, D. D. (Medical Res. Center, Brookhaven Natl. Lab., Upton, NY 11973). *Experientia* 34(1):120-122; 1978.

6648 EFFECT OF SECRETIN ON MUCINOUS SECRETION BY THE ISOLATED CANINE STOMACH PERFUSED EXTRACORPOREALLY. (Eng.) Kowalewski, K.; Pachkowski, T.; Kolodej, A. (Surgical-Medical Res. Inst., Univ. Alberta, Edmonton, Alberta T6G 2N8, Canada). *Pharmacology* 16(2):78-82; 1978.

6649 TOPOGRAPHICAL STUDIES ON HISTAMINE- AND ADRENALINE-SENSITIVE ADENYLATE CYCLASES IN GASTRIC AND DUODENAL MUCOSA OF HUMAN BEINGS. (Eng.) Simon, B.; Czygan, P.; Frohling, W.; Kather, H. (Medizinische Universitatsklinik Heidelberg, Bergheimerstrasse 58, D-6900 Heidelberg, W. Germany). *Digestion* 16(1/2):185-188; 1977.

6650 PREVENTION OF STRESS ULCERATIONS USING H_2 RECEPTOR ANTAGONISTS. (Eng.) Strauss, R. J.; Stein, T. A.; Wise, L. (Long Island Jewish-Hillside Medical Center, New Hyde Park, NY 11040). *Am. J. Surg.* 135(1):120-126; 1978.

6651 RAT GASTRIC SECRETION AND MUCOSAL BLOOD FLOW DURING RESTRAINT STRESS--EFFECT OF A LOW DOSE METIAMIDE. (Eng.) Schwille, P. O.; Lang, G.; Hofmann, P. (Dept. Surgery, Univ. Erlangen-Nurnberg, Maximiliansplatz, D-8520 Erlangen, W. Germany). *Res. Exp. Med.* 171(3):205-210; 1977.

6652 ASSESSMENT OF GASTRIC MUCOSAL DAMAGE: COMPARATIVE EFFECTS OF ASPIRIN AND FENCLOFENAC ON THE GASTRIC MUCOSA OF THE GUINEA PIG. (Eng.) Garner, A. (Biomedical Center, P.O. Box 572, 721 23 Uppsala, Sweden). *Toxicol. Appl. Pharmacol.* 42(3):477-486; 1977.

6653 PRODUCTION OF GASTRIC ULCERS IN CATS BY INTRAVENOUS ACETAMINOPHEN PLUS HISTAMINE [Abstract]. (Eng.) Hansen, D. G.; Grossman, M. I. (Veterans Admin. Wadsworth Hosp. Center, Los Angeles, CA). *Clin. Res.* 26(2):110A; 1978.

6654 THE VIRGINIA OPOSSUM AS A MODEL FOR STUDYING GASTRIC SECRETORY FUNCTION [Abstract]. (Eng.) Sorensen, M. C. (Univ. Utah Sch. Medicine, Salt Lake City, UT). *Clin. Res.* 26(2):113A; 1978.

6655 GUANYL CYCLASE ACTIVITY OF GUINEA PIG GASTRIC MUCOSA [Abstract]. (Eng.) Griessen, M. (Hopital Cantonal, Geneve, Switzerland). *Digestion* 16(1/2):211; 1977.

6656 BIOSYNTHESIS OF RAT GASTRIC EPITHELIAL GLYCOPROTEIN [Abstract]. (Eng.) Strous, G. J. A. M.; Kramer, M. F. (Dept. Medicine, Univ. Utrecht, Utrecht, Netherlands). *Adv. Exp. Med. Biol.* 89:501; 1977.

6657 STRESS, DRUGS AND GASTRIC MUCUS SYNTHESIS [Abstract]. (Eng.) MacDonald, A.; Gottfried, S.; Sacra, P.; Parke, D. V. (Biorex Lab., Biorex House, Canonbury Villas, London N1 2HB, England). *Adv. Exp. Med. Biol.* 89:518; 1977.

6658 STOMACH PROTEINASES SEPARATION, SPECIFICITY, AND CHANGES AFTER ADMINISTRATION OF SECRETION STIMULI. (Eng.) Korbova, L.; Kohout, J.; Kasafirek, E.; Cizkova, J. (Faculty General Medicine, Charles Univ., 120 00 Prague 2, Czechoslovakia). *Coll. Czech. Chem. Commun.* 42(8):2577-2585; 1977.

6659 GRANULE RELEASE FROM ENDOCRINE CELLS IN THE RAT STOMACH--AN ELECTRON MICROSCOPIC STUDY. (Eng.) Sano, M.; Tobe, T. (Shizuoka City

Hosp., 10-93 Otemachi, Shizuoka 420, Japan). *Arch. Jpn. Chir.* 46(5):576-584; 1977.

6660 SPECIFIC ADHESION OF LACTOBACILLI TO KERATINIZED EPITHELIAL CELLS OF THE RAT STOMACH IN VITRO. (Eng.) Kawai, Y.; Suegara, N. (Yakult Inst. Microbiological Res., 1796 Yaho, Kunitachi, Tokyo, Japan). *Am. J. Clin. Nutr.* 30(11):1777-1780; 1977.

6661 THE ROLE OF ISCHEMIA IN THE PATHOGENESIS OF STRESS INDUCED GASTRIC LESIONS IN PIGLETS. (Eng.) Hottenrott, C.; Seufert, R. M.; Becker, H. (Dept. Surgery, Univ. Heidelberg, Heidelberg, W. Germany). *Surg. Gynecol. Obstet.* 146(2):217-220; 1978.

6662 EFFECT OF PHYSICAL EXERCISE ON GASTRIC BASAL SECRETION IN HEALTHY MEN. (Eng.) Markiewicz, K.; Cholewa, M.; Gorski, L.; Chmura, J. (Inst. Internal Medicine, Medical Acad., Lodz, Poland). *Acta Hepatogastroenterol. (Stuttg.)* 25 (5):377-380; 1977.

6663 EFFECT OF SALICYLATES ON CYCLIC AMP IN ISOLATED RAT GASTRIC MUCOSA. (Eng.) Mitznegg, P.; Estler, C. J.; Loew, F. W.; van Seil, J. (Pharmakologisches Institut, Universitat Erlangen-Nurnberg, Universitatsstr. 22, D-8520 Erlangen, W. Germany). *Acta Hepatogastroenterol. (Stuttg.)* 24(5):372-376; 1977.

6664 INFLUENCE OF METIAMIDE AND ATROPINE ON PEPSINOGEN SECRETION IN THE CONSCIOUS RAT. (Eng.) Szelenyi, I.; Thiemer, K. (Dept. Pharmacology, Pharma-Res., Chemiewerk Homburg, D-6000 Frankfurt am Main, W. Germany). *Experientia* 33(12):1620-1621; 1977.

See also, 6569, 6571, 6602, 6617, 6735, 6767, 6789, 6839, 6859, 6878, 6885, 6904, 6914.

SECRETION AND METABOLISM

Pancreas

6665 SECRETORY FUNCTION OF ISOLATED CANINE PANCREAS PERFUSED WITH FLUOROCARBON EMULSION. (Eng.) Kowalewski, K.; Kolodej, A. (Surgical-Medical Res. Inst., Univ. Alberta, Edmonton, Alberta, Canada). *Surg. Gynecol. Obstet.* 146(3): 375-378; 1978.

To assess the suitability of fluorocarbon emulsion for simultaneous perfusion of the canine stomach and pancreas, a gastroduodenopancreatic block was isolated that preserved the arterial circulation of the pancreas and was perfused *ex vivo* with a fluorocarbon emulsion oxygenated *in vitro* and containing a simulated physiologic protein-free solution. Pancreatic secretion was stimulated by secretin or cholecystokinin given as constant infusions over 5-6 hr into the arterial circulation. The response of the pancreas was essentially identical to that observed under *in vivo* conditions or during the perfusion of the isolated pancreas with homologous blood. Clear pancreatic secretion was collected for the entire 5-6 hr in response to both secretin and cholecystokinin. Gastric secretion was yellowish and contained, after about 3 hr of perfusion, a white fluorocarbon sediment. After 5 hr of perfusion, gastric corpus edema was evident, but at no time during 6 hr of perfusion was pancreatic edema noted. The volume, bicarbonate concentration, total protein concentration, and Cl^- concentration were significantly higher ($p<0.001$) in the secretin-induced secretion than in the cholecystokinin-induced secretion. The secretory viability of the canine pancreas is well-preserved under the conditions used in this study.

6666 COMPARISON OF THE BIOLOGICAL POTENCY OF A NEW SYNTHETIC PREPARATION OF SECRETIN WITH THAT OF NATURAL PORCINE SECRETIN IN THE DOG. (Eng.) Gyr, K.; Kayasseh, L.; Rittmann, W. W.; Girard, J.; Stalder, G. A. (Kantonsspital Basel, Switzerland). *Gut* 19(5):355-357; 1978.

The biological activity of a new synthetic secretin on exocrine pancreatic secretion was compared with that of natural porcine secretin in conscious dogs with chronic gastric and duodenal fistulae. The dose-response curves of the two preparations were parallel and nearly identical. The variances of the data were reduced when the parameters of pancreatic secretory response were corrected for body weight. Equimolar amounts of synthetic secretin and natural secretin produced responses of volume and bicarbonate secretion that were not significantly different. It is concluded that the new synthetic secretin is useful for clinical and research purposes.

6667 THE PHYSICAL CHEMISTRY OF PANCREATIC CALCIFICATION AND STONE FORMATION: VI. THERMODYNAMICALLY ALLOWABLE IONIZED AND TOTAL SOL-

UBLE CALCIUM [Abstract]. (Eng.) Moore, E. W.; Verine, H. J. (Medical Coll. Virginia, Richmond, VA). *Gastroenterology* 72(5, Part 2):1105; 1977.

6668 THE EFFECT OF PANCREATIC STIMULATION ON SERUM AND URINE AMYLASE ISOENZYMES [Abstract]. (Eng.) MacGregor, I. L.; Derugin, N. (Veterans Admin. Hosp., San Francisco, CA). *Gastroenterology* 72(5, Part 2):1092; 1977.

6669 PANCREATIC GLUCAGON, ENTEROGLUCAGON AND GASTRIN RESPONSES TO FEEDING IN OBESE AND LEAN SUBJECTS [Abstract]. (Eng.) Connell, A. M.; Brown, P.; Fairman, M. J. (Univ. Cincinnati Medical Center, Cincinnati, OH). *Gastroenterology* 72(5, Part 2):1040; 1977.

6670 EFFECT OF PANCREATIC JUICE AND BILE SALTS ON SOME PARAMETERS OF HAEMOSTASIS [Abstract]. (Eng.) Gabryelewicz, A.; Engel, A. M.; Alexander, B.; Parts, A. (Gastroenterology Clinic, Bialystok, Poland). *Ir. J. Med. Sci.* 146(Suppl. 1): 45; 1977.

6671 IMPORTANCE OF LIPID METABOLISM IN THE EXOCRINE PANCREAS. SIGNIFICANCE OF PHOSPHATIDYLINOSITOL (PI) TURNOVER IN RESPONSE TO SECRETAGOGUES INDUCING CALCIUM EFFLUX [Abstract]. (Eng.) Christophe, J.; Calderon, P. (Free Univ. Brussels Medical Sch., Brussels, Belgium). *Ir. J. Med. Sci.* 146(Suppl. 1):5-6; 1977.

6672 VASOACTIVE INTESTINAL PEPTIDE: INTERACTION WITH SECRETIN ON ISOLATED RAT PANCREAS [Abstract]. (Eng.) Tournut, R.; Estival, A.; Vaysse, N.; Pascal, J. P.; Ribet, A. (INSERM U-151, CHU Rangueil, 31052, Toulouse, France). *Ir. J. Med. Sci.* 146(Suppl. 1):20-21; 1977.

6673 INDOMETHACIN TREATMENT OF ACUTE EXPERIMENTAL PANCREATITIS (AEP) IN THE RAT [Abstract]. (Eng.) Lankisch, P. G.; Koop, H.; Winckler, K.; Kunze, H.; Vogt, W.; Creutzfeldt, W. (Dept. Medicine, Univ. Gottingen, Gottingen, W. Germany). *Ir. J. Med. Sci.* 146(Suppl. 1):9-10; 1977.

6674 ACTION OF INTRAPERITONEAL APROTININ ADMINISTRATION ON EXPERIMENTAL ACUTE PANCREATITIS OF THE RAT [Abstract]. (Eng.) Di Costanzo, J.; Escoffier, J. M.; Figarella, C.; Bourry, J.; Bonneau, H. P.; Gauthier, A. (Hopital Sainte-Marguerite, Marseille, France). *Digestion* 16(1/2):206; 1977.

6675 EXPERIMENTAL ACUTE PANCREATITIS PRODUCED BY SCORPION VENOM [Abstract]. (Eng.) Bartholomew, C.; Murphy, J. J.; Jankey, N.; Hanchard, B.; FitzGerald, O.; McCeeney, K. F. (Dept. Medicine, Univ. West Indies, Trinidad). *Ir. J. Med. Sci.* 146(Suppl. 1):7-8; 1977.

6676 THE NEURAL CONTROL OF EXOCRINE AND ENDOCRINE PANCREAS. (Eng.) Tiscornia, O. M. (Sch. Medicine Buenos Aires, Buenos Aires, Argentina). *Am. J. Gastroenterol.* 67(6):541-560; 1977.

See also, 6748, 6749, 6750, 6763, 6785, 7044, 7045, 7048, 7053, 7058, 7175, 7208.

SECRETION AND METABOLISM

Hepatobiliary Tract

6677 DETERMINANTS OF FASTING AND POSTPRANDIAL SERUM BILE ACID LEVELS IN HEALTHY MAN. (Eng.) LaRusso, N. F.; Hoffman, N. E.; Korman, M. G.; Hofmann, A. F.; Cowen, A. E. (Mayo Clinic and Mayo Foundation, Rochester, MN 55901). *Am. J. Dig. Dis.* 23(5):385-391; 1978.

The relationship between serum levels of cholic acid conjugates measured by radioimmunoassay, bile acid absorption, and hepatic clearance was studied to define the determinants of fasting and postprandial serum bile acids in healthy man. Acute or chronic interruption of the enterohepatic circulation caused a significant decrease in basal serum levels of cholyl conjugates in both dogs and humans ($p<0.05$), while liquid or solid meals caused a marked and reproducible increase in serum cholyl conjugates (humans studied only, $p<0.05$). A temporal correlation was demonstrated postprandially or after i.v. cholecystokinin (0.0625 U/kg/min for 30 min) between intestinal transit of bile acids and simultaneous changes in levels of serum cholyl conjugates. The plasma disappearance of i.v. injected radiolabeled cholylglycine was shown to be unaffected by serum levels of endogenous cholyl conjugates. These data are consistent with the interpretation

that, in the presence of normal hepatic function, the major determinant of serum bile acids is their rate of intestinal absorption.

6678 ROLE OF ADENOSINE 3',5'-MONOPHOSPHATE (CYCLIC AMP) IN CANINE BILE-SALT-STIMULATED CHOLERESIS. (Eng.) Kaminski, D. L.; Ruwart, M. J.; Deshpande, Y. G. (St. Louis Univ. Sch. Medicine, St. Louis, MO). *Surg. Forum* 28:409-411; 1978.

To determine whether cyclic 3',5'-adenosine monophosphate (cAMP) functions as an intracellular mediator of bile salt-stimulated increases in hepatic bile flow, the effects of various doses of sodium taurocholate on bile cAMP secretion were evaluated in dogs with chronic gastric and biliary fistulas. Sodium taurocholate was infused for 90 min at doses of 9, 19, 37, 74, 149, or 298 μmol/min after the endogenous bile salt pool had been depleted by total diversion for 60 min. Progressive increases in sodium taurocholate dose caused progressive increases in bile volume, bile salt concentration, and bile salt output. There was a dose-related decrease in cAMP concentration and output that plateaued at 149 μmol/min (782 ± 146 pmol/ml and 44 ± 9 pmol/min, resp.); cAMP concentration and output at 9 μmol/min taurocholate were 6,508 ± 503 pmol/ml and 89 ± 18 pmol/min, resp. The results suggest that bile salt-stimulated canalicular bile flow is not mediated by cAMP.

6679 BINDING OF CHOLIC ACID TO SOLUBLE PROTEINS FROM RAT LIVER. (Eng.) McClelland, M. J.; Smallwood, R. A.; Hoffman, N. E.; Hoogenraad, N. J. (Austin Hosp., Heidelberg 3084, Australia). *FEBS Lett.* 82(2):255-258; 1977.

The binding of cholic acid to cytoplasmic proteins from the rat liver was examined. Most of the labeled bile acid was in the nuclei/membrane (31%) and supernatant (52%) fractions. In the supernatant fraction, the percentage of ^{3}H-cholic acid bound to protein as determined by ultrafiltration varied between 30% and 45%. Over 98% of the ^{3}H-cholic acid applied to the Sephadex G-75 column eluted as a single peak, at an elution volume identical to that of free ^{3}H-cholic acid. Thus, ^{3}H-cholic acid did not remain bound to the supernatant protein during gel filtration. In contrast, the ^{3}H-cholic acid did not become separated from protein during ultrafiltration using a membrane with a normal molecular weight retention limit of 50,000 daltons. Supernatant fractions from the column showed two areas that bound ^{14}C-cholic acid, the first fraction corresponding to a molecular weight of approximately 65,000 daltons and the second to 30,000-40,000 daltons. After the removal of albumin by diethylaminoethane (DEAE) chromatography, the two fractions that bound cholic acid were still present at the same molecular weight, showing that there were at least two proteins other than albumin that bind cholic acid. Proteolytic digestion with pronase completely destroyed all binding in these fractions, and the biochemical tests were positive for protein and negative for carbohydrate, suggesting that the binding species are protein, not glycoprotein.

6680 EFFECTS OF CHLORPROMAZINE HYDROCHLORIDE AND ITS METABOLITES ON Mg^{2+}- AND Na^{+},K^{+}-ATPase ACTIVITIES OF CANALICULAR-ENRICHED RAT LIVER PLASMA MEMBRANES. (Eng.) Samuels, A. M.; Carey, M. C. (Univ. Texas Health Science Center at Houston, P.O. Box 20708, Houston, TX 77025). *Gastroenterology* 74(6):1183-1190; 1978.

Because chlorpromazine hydrochloride has been reported to inhibit bile salt-dependent (BSD) and -independent (BSI) bile flow in a predictable fashion in primates and because a significant fraction of BSI bile flow is postulated to depend upon the activity of a canalicular membrane Na^{+},K^{+}-ATPase, the effects of chlorpromazine hydrochloride and its metabolites on the ATPase activities of canalicular-enriched rat liver plasma membranes were examined. Chlorpromazine inhibited the activities of both Mg^{2+}- and Na^{+},K^{+}-ATPases with a linear dose-response relationship between 10 and 100 μM. The inhibition of Na^{+},K^{+}-ATPase was pH dependent, showing a maximal inhibition at pH 7.8. Over the pH range 7.0 to 8.2, the inhibition was significantly reduced with the addition of glutathione ($p<0.05$) and was augmented under experimental conditions (UV irradiation and peroxidase-H_2O_2, by from 41% to 98% and from 38% to 80%, resp.) that promote the formation of the chlorpromazine semiquinone free radical. The 7-hydroxychlorpromazine metabolite was as active an inhibitor as the parent drug; however, two sulfoxide metabolites, chlorpromazine sulfoxide and 7-hydroxychlorpromazine sulfoxide, were less effective inhibitors of Na^{+},K^{+}-ATPase. These data are consistent with the hypothesis that chlorpromazine cholestasis may be a result of a direct toxic effect on the ATPase activities of hepatic canalicular membranes. The results further suggest that if chlorpromazine cholestasis occurs through an interaction with canalicular membrane ATPases, the degree of cholestasis may well be influenced by the extent of the conversion of the drug to its more active (free radical) or minimally active (sulfoxide) metabolites and by the local environment (pH and glutathione concentration) of the canalicular membrane.

6681 THE EFFECT OF S-ADENOSYL-L-METHIONINE ON ETHYNYLESTRADIOL-INDUCED IMPAIRMENT OF BILE FLOW IN FEMALE RATS. (Eng.) Stramentinoli, G.; Gualano, M.; Di Padova, C. (BioResearch Co., I-20060 Liscate, Milano, Italy). *Experientia* 33 (10):1361-1362; 1978.

Because S-adenosyl-L-methionine (SAMe) is the methylating agent in the enzymatic methylation by catechol-*O*-methyl transferase (CMT), the effect of SAMe administration on the bile flow reduction caused by ethynylestradiol (EE) was examined in female Sprague-Dawley rats. Five groups of animals were treated as follows: group 1, 2.5 mg/kg EE for 3 days by gastric intubation; group 2, EE as before plus 10 mg/kg SAMe i.m. t.i.d. for 3 days; group 3, same

as group 2 except 25 mg/kg SAMe; group 4, solvent for EE (control); and group 5, same as group 4 plus 25 mg/kg SAMe on same schedule as group 3 (control). Bile flow and bile salt concentration were determined after a 12-hr fast. Bile flow was slower in EE-treated rats than in either group of controls ($p<0.05$). Either dose of SAMe given with EE was capable of restoring bile flow to control values. The bile salt concentration was higher in EE-treated animals than in any other group ($p<0.01$), although the amount excreted did not change significantly. When the bile salt independent fraction of bile was calculated for the groups, a significant difference was observed between the value for EE-treated rats (0.49 µl/min/g liver) and that for controls (1.30 µl/min/g liver, $p<0.01$) and between the value for EE-treated rats and the values for rats treated with 10 mg/kg SAMe (1.15 µl/min/g liver) and 25 mg/kg SAMe (1.40 µl/min/g liver, $p<0.01$ for both). If bile flow during the first 30 min of collection is considered to be 100%, then the bile salt-independent fraction of bile water represents 66% of total bile flow in the controls, 39.2% in EE-treated rats, and 60 and 68%, resp., in rats treated with 10 or 25 mg/kg SAMe in addition to EE. These results are in good agreement with the hypothesis that the reduction of bile flow after EE administration may be associated with alteration of the canalicular water secretion into bile independently of the secretion of bile salts. It is postulated that SAMe exerts its effects by reducing the binding of methylated steroids to microsomal proteins in rat liver, perhaps by favoring the enzymatic methylation of the catechol estrogens by CMT.

6682 INDEPENDENCE OF BILE ACID AND OUABAIN HEPATIC UPTAKE: STUDIES IN THE NEWBORN RAT. (Eng.) Klaassen, C. D. (Univ. Kansas Medical Center, Kansas City, KS 66103). *Proc. Soc. Exp. Biol. Med.* 157(1):66-69; 1978.

Studies were carried out in newborn and adult Sprague-Dawley rats to determine whether bile acids are transported by the same process that transports neutral organic compounds or steroids in the liver. The plasma taurocholic acid concentration 15 min after the i.v. administration of taurocholic acid (30 mg/kg) was approximately 6 µg/ml in rats 20 days of age and older, whereas the concentration was more than fourfold higher in 10-day-old rats. There was a marked decrease in the plasma concentration of taurocholic acid 15 min after its administration as the rats increased in age from 5 to 20 days, and the plasma concentration in the 5-day-old rats was significantly lower than that in the 10-day-old rats ($p<0.05$). The taurocholic acid concentration was measured in the plasma, liver, and intestine at 2, 5, 10, 20, and 30 min after its administration to 7- and 39-day-old rats. The plasma level of taurocholic acid was already significantly higher ($p<0.05$) in the 7-day-old than in the 39-day-old rats at 2 min after administration, suggesting a larger volume distribution. The difference between the newborn and adult became greater at the longer time intervals. The taurocholate concentration in the liver of the newborn rat was significantly higher than that in the adult at 5 min after administration and at all times thereafter ($p<0.05$). The ratio of hepatic taurocholic acid concentration to its concentration in the plasma in the newborn rat was significantly lower ($p<0.05$) than in the older animals at the 2-min interval but was similar to the adult rat at all times thereafter. The newborn rats excreted significantly less ($p<0.05$) taurocholate into the intestine than the adults at all times after administration except at 30 min. The slower plasma disappearance and biliary excretion of taurocholic acid in the newborn appears to be due largely to a less efficient transfer of taurocholic acid from the liver into the bile, while the liver/plasma concentration ratio of taurocholate in the newborn is similar to that in the adult. The fact that ouabain cannot be taken up and concentrated in the newborn rat liver suggests that taurocholic acid and ouabain are transported into the hepatocyte by different systems.

6683 INFLUENCE OF PENTAGASTRIN, CHOLECYSTOKININ AND CERULEIN ON BILE PRODUCTION IN THE RAT. (Fre.) Dangoumau, J.; Balabaud, C.; Bussiere-Leboeuf, C.; Dallet-Duverge, F.; Noel, M. (Laboratoire de Pharmacologie, Universite de Bordeaux II, 3, place de la Victoire, F 33000 Bordeaux, France). *J. Pharmacol. (Paris)* 8(2):197-204; 1977.

The effects of pentagastrin, cholecystokinin, and cerulein (all possessing the same C-terminal tetrapeptide) on bile production were compared in 60 anesthetized male Wistar rats with acute biliary fistulas. When pentagastrin was perfused into the hepatic artery or portal vein (10 µg/100 g body weight/hr for 1 hr), there was no effect on bile flow. When cholecystokinin was perfused (1 U/100 g body weight/hr, for 1 hr) into the jugular vein, there was an average increase of bile flow of 23% (from 6.73 ± 1.14 to 8.28 µl/100 g body weight/min). The concentration and, to a lesser degree, the output of bile salts decreased significantly ($p<0.02$). The concentration of bicarbonates did not change, but their output increased significantly ($p<0.001$). Erythritol clearance increased significantly from 7.16 ± 1.19 to 8.2 ± 0.94 µl/100 g/min, $p<0.01$, and the bile to plasma erythritol concentration ratio decreased significantly from 1.03 ± 0.01 to 0.97 ± 0.03 ($p<0.02$). A cerulein perfusion into the jugular (2 µg/100 g body weight/hr, for 1 hr) caused an average increase of bile flow of 19% (from 7.62 ± 0.98 to 9.11 ± 1.70 µl/100 g body weight/min). The concentration and output of bile salts decreased significantly ($p<0.001$) and the bicarbonate output and concentration increased significantly ($p<0.001$). These results suggest that pentagastrin, cholecystokinin, and cerulein have different effects on bile production in rats, in spite of their similar structure. The rat is insensitive to the hormone pentagastrin. Although cerulein increases the bile flow, its effect is very variable. Cholecystokinin stimulates ductular secretion of bile, but it also may inhibit the eventual ductular reabsorption of water, Na^+, and Cl^- and increase ductular permeability to erythritol.

6684 INFLUENCE OF SECRETIN ON BILE PRODUCTION IN THE RAT. (Fre.) Balabaud, C.; Noel, M.; Dangoumau, J. (Laboratoire de Pharmacologie, Universite de Bordeaux II, 3, place de la Victoire, F 33000 Bordeaux, France). *J. Pharmacol. (Paris)* 8(2):191-196; 1977.

The effect of secretin on the rat was studied to clarify its physiological impact on bile production in this species. Anesthetized male Wistar rats were perfused for 30 min with a solution of NaCl (9 g/l) with the addition of secretin for 60 min (20 U/kg body weight/hr). In seven of eight rats perfused into the hepatic artery, the average bile flow increased significantly ($p<0.001$) from a basal value of 5.84 ± 0.64 to 6.81 ± 1.12 µl/100 g/min when secretin was administered. The concentration and biliary flow of bicarbonates also increased significantly (from 0.175 ± 0.019 to 0.256 ± 0.060 µEq/100 g/min, $p<0.01$). When secretin was perfused into the portal vein, bile flow rose significantly in seven of eight rats (from 5.46 ± 0.94 to 6.51 ± 0.80 µl/100 g/min); the concentration of bicarbonates essentially did not change, but their output rose markedly. When ^{14}C-erythrol was injected into the penial vein of seven rats, its clearance increased from 6.48 ± 0.76 to 6.79 ± 1.20 µl/100 g/min during the secretin administration; the rise was not significant. When secretin was infused into the jugular vein, it failed to induce an increase in bile flow or bicarbonate output. These results show that secretin has a very weak choleretic effect in the rat as compared to man or dog, even when given in very high doses.

6685 EFFECTS OF PORTACAVAL SHUNT ON BILE ACID METABOLISM IN DOGS. (Eng.) Kuo, J.; Pertsemlidis, D.; Panveliwalla, D. (Mount Sinai Sch. Medicine, City Univ. New York, New York, NY). *Surg. Forum* 28:402-403; 1977.

To investigate how the shunting of bile acid-rich portal blood into the systemic periphery affects hepatic synthesis and pool size of bile acids and to validate the isotope dilution method of Lindstedt, studies were performed before (control) and after end-to-side portacaval shunt was carried out in 12 female adult mongrel dogs. Studies were done in the steady state, i.e., in the absence of liver failure and with the maintenance of constant body weight. Cholecystokinin-stimulated bile was collected for 6-7 days after i.v. infusion of 10-15 µCi of ^{14}C-cholic or ^{14}C-chenodeoxycholic acid. The pool size of cholic acid was significantly decreased after shunt (from 1,720 ± 610 to 524 ± 134 mg, $p<0.001$). The synthesis of cholic acid declined significantly after shunt (from 701 ± 300 to 351 ± 137 mg/day, $p<0.01$). The fractional turnover rate for cholic acid increased significantly after shunt (from 0.421 ± 0.118/day to 0.705 ± 0.426/day, $p<0.001$). Cholic acid made up 80%, deoxycholic acid 18%, and chenodeoxycholic acid 2% of the total bile acid mass. In two control and two shunted dogs, a known dose of ^{14}C-24-cholic acid was given i.v. 12 hr prior to sacrifice, and postmortem chemical measurement of the cholic acid pool (percentage recovery of isotope and bile acid mass in the gallbladder, liver, and intestine) was compared with pool size estimates in premortem isotope dilution studies. The isotope dilution method underestimated pool size by 27-31% in three of the four dogs. Postmortem isotope recovery was more than 90%. It is concluded that the shunted liver is unable to accelerate bile acid synthesis in response to the increased fractional turnover and presumed diminution of bile acid return. The decline in hepatic bile synthesis may be due to hepatocyte dysfunction. The isotope dilution method appears to underestimate bile acid pool size.

6686 CHOLESTEROL KINETICS FOLLOWING PORTACAVAL SHUNT IN DOGS. (Eng.) Coyle, J. J.; Guzman, I. J.; Varco, R. L.; Buchwald, H. (Univ. Minnesota Medical Sch., Minneapolis, MN). *Surg. Forum* 28:404-405; 1977.

Because portacaval shunt (PCS) has been proposed as a therapy for type II homozygous hypercholesterolemia, a study was undertaken to determine cholesterol (CH) kinetics (pool size and production rate) in the dog 1 yr after PCS. Three mongrel dogs that had undergone end-to-end PCS 44 weeks previously and five control dogs, all of which were in CH steady state (stable plasma CH levels and stable weights) were given i.v. injections of ^{14}-CH, and the plasma CH specific activity was determined biweekly for 5 weeks. Analysis of the data permitted the determination of both the rapidly and slowly miscible CH pool sizes and of the CH production rate. There were no significant differences in these three parameters between the control and PCS animals. The only significant difference ($p<0.01$) between the two groups was that the plasma cholesterol level of the controls (157 mg/100 ml) exceeded that of the PCS animals (76 mg/100 ml). Three explanations for the hypocholesterolemic mechanism of PCS in the dog are suggested: (1) changes may occur in CH transport, a decrease may occur in lipoprotein synthesis, or an increase may occur in lipoprotein catabolism, (2) shifts may occur in the CH pool distribution that were not detected in this isotopic model, or (3) shifts may occur in the CH pool between the compartments of the rapidly miscible pool that are undetectable in measurements of the total pool.

6687 DECREASED CHOLESTEROL AND FATTY ACID SYNTHESIS FOLLOWING PORTACAVAL SHUNT. (Eng.) James, J. H.; Soeters, P. B.; Escourrou, J.; Fischer, J. E. (Massachusetts General Hosp., Boston, MA). *Surg. Forum* 28:397-399; 1977.

To examine the mechanism whereby portacaval anastomosis (PCA) reduces plasma levels of triglycerides and cholesterol (C), *in vivo* hepatic lipid synthesis was measured in the rat after PCA. PCA was performed in 32 female Sprague-Dawley rats and sham operation in 32 others; 2 weeks later, hormonal and absorptive effects were synchronized by a feeding schedule that lasted 2 weeks. On the day of the experiment, half of each group was fed and half was starved, each animal received $^{3}H_2O$ i.v., and

animals were killed 0.5, 1, 2, or 4 hr after injection. Homogenized organs were examined for ^{3}H-labeled fatty acids (FA) and C. A significant reduction ($p<0.01$) in FA synthesis after PCA was seen at all times after injection of $^{3}H_2O$ in both fed and starved rats. FA synthesis was markedly stimulated by feeding, but this stimulation was reduced by PCA. Hepatic synthesis of C was significantly decreased ($p<0.01$) by PCA in the starved rats, but a significant reduction in the fed group with PCA was seen only at the 4-hr point ($p<0.01$). These results suggest that the diversion of portal flow from the liver by PCA leads to reduced hepatic substrate supply and hence to reduced FA synthesis. The reduced substrate supply may not be limiting for the synthesis of C after PCA, and other regulatory factors may be more important.

6688 EFFECT OF SUCROSE ON LIPOGENESIS OF RATS CHRONICALLY TREATED WITH ETHANOL. (Eng.) Pennington, S. N.; Barakat, H. A.; Dohm, G. L.; Smith, C. P. (Sch. Medicine, East Carolina Univ., Greenville, NC 27834). *Experientia* 34(5):564-565; 1978.

To find a method of ethanol dosing that would allow normal weight gain, the effect of sucrose on lipogenesis was studied in male, alcohol-fed Holtzman rats. Fifteen animals received ethanol (4 g/kg/day) as a 50/50 (volume/volume) solution in normal saline by stomach tube, and 15 controls received saline alone. In another group, 15 animals received a mixture of 25% sucrose and 25% ethanol in water (weight/volume/volume) as their only source of fluid, and an equal number of controls received a 25% sucrose solution. At the end of 28 and 56 days, the livers and epididymal fat pads were removed and analyzed for several lipogenic enzymes in six animals from each of the four groups. Adipose tissue glucose-6-phosphate dehydrogenase (G6PDH), fatty acid synthetase (FAS), and citrate cleavage enzyme (CCE) activities were significantly elevated ($p<0.05$) after 28 days of ethanol treatment, in comparison with the levels in saline-treated controls; malic enzyme (ME) was also raised, but not significantly. Liver enzyme levels were unaffected, and only liver CCE was significantly elevated after 56 days of ethanol treatment. Ethanol plus sucrose treatment caused significant decreases in adipose and liver ME activity at 28 days, compared with those in animals treated with sucrose alone ($p<0.05$). At 56 days, sucrose plus ethanol treatment caused significant decreases ($p<0.05$) in all tissues of all enzymes studied except liver CCE. Sucrose alone caused 2- to 10-fold increases in all enzymes in all tissues, relative to saline-treated animals. The results show that, depending on whether sucrose is used in the control, ethanol can increase or decrease the activities of lipogenic enzymes, particularly in rat adipose tissue.

6689 EFFECT OF EXPERIMENTAL BILIARY OBSTRUCTION ON THE PLASMA AND ERYTHROCYTE LIPIDS OF THE GUINEA PIG AND ON PLASMA PHOSPHATIDYLCHOLINE-CHOLESTEROL ACYLTRANSFERASE ACTIVITY. (Eng.) Owen, J. S.; Bruckdorfer, K. R.; McIntyre, N. (Royal Free Hosp. Sch. Medicine, 8 Hunter St., London WC1N 1BP, England). *Biochem. Soc. Trans.* 5(5):1330-1333; 1977.

The guinea pig was assessed as an experimental model to establish whether the increases in plasma phospholipid and unesterified cholesterol and the changes in erythrocyte lipid content and morphology that are seen in human biliary obstruction occur in this animal. Double ligation or sham-operation was performed on the common bile ducts of male Dunkley-Hartley guinea pigs, and animals were killed 2, 5, or 12 days later. There was also a group of nonoperated controls. The concentrations of plasma bile acids were significantly higher in operated animals at all three times compared with nonoperated controls ($p<0.001$): 295 ± 120, 328 ± 119, and 796 ± 56 nM at 2, 5, and 12 days, resp., compared with 14 ± 6 nM in controls. Total phospholipid and unesterified cholesterol levels were significantly higher ($p<0.01$) in operated animals only at 12 days (0.74 ± 0.16 mM versus 0.43 ± 0.02 mM in controls and 0.34 ± 0.02 mM versus 0.19 ± 0.03 mM in controls, resp.). The percentage of unesterified cholesterol was significantly higher in operated animals (32 ± 5, 30 ± 2, and 47 ± 15% at 2, 5, and 12 days, resp.; $p<0.05$, $p<0.01$, and $p<0.05$, resp.) compared with controls (23 ± 1%). The phosphatidylcholine-cholesterol acyltransferase activity in operated animals did not decrease compared with sham-ligated controls, although one of two 12-day postoperated animals did show a marked decrease. The RBC of the 12-day and two of the four 5-day postoperated animals showed abnormal morphology and appeared similar to the spur cells of human liver disease; these animals were also the only ones to show an increased RBC cholesterol/phospholipid ratio compared with controls, although in three of the four animals the increase was modest (6-10%). The phospholipid content and the composition of the individual phospholipids was not altered. No differences in osmotic fragility of RBC from operated and sham-operated animals was found. The lack of marked increases in plasma phospholipid or unesterified cholesterol concentrations might be due to only minor biliary regurgitation of phospholipid into the plasma owing to the presence of a distensible gallbladder. Ligation of the bile duct above the gallbladder in the guinea pig might therefore prove a more suitable model.

6690 DISSOCIATION BETWEEN RATE OF HEPATIC LIPOPROTEIN SECRETION AND HEPATOCYTE MICROTUBULE CONTENT. (Eng.) Reaven, E. P.; Reaven, G. M. (Stanford Univ. Sch. Medicine, Palo Alto, CA 94304). *J. Cell Biol.* 77(3):735-742; 1978.

To further define the relationship between microtubules and hepatic very low density lipoprotein (VLDL) secretion, experiments were carried out to see if changes in hepatic VLDL secretion are associated with changes in hepatocyte microtubule or tubulin content. In acute experiments, VLDL secretion was increased by perfusion of isolated rat livers for 2 hr with varying concentrations of free fatty acids (FFA). Hepatic VLDL triglyceride (TG) secretion at perfusate FFA levels of 0.7 μEq/ml was

threefold greater ($p<0.01$) than when livers were perfused without added FFA. However, no differences were observed in the content of microtubules in these livers: specifically, microtubules occupied 0.029% of hepatocyte cytoplasm in livers perfused without FFA and 0.030% of cytoplasm in livers perfused with FFA. In chronic experiments, rats were fed for 1 week with either standard rat chow or a hyperlipemic (sucrose/lard) diet. With the experimental diet, plasma triglyceride levels increased threefold over controls, and liver VLDL-TG production, as determined by [^{3}H]glycerol turnover studies, was 55% greater ($p<0.01$) than controls. However, microtubules occupied 0.027% of the cytoplasm of hepatocyte cytoplasm whether rats were on standard or hyperlipemic diets. Furthermore, the tubulin content of isolated hepatocytes did change, and represented 1% of hepatocyte soluble protein, irrespective of diet. These results suggest that increases in hepatic VLDL secretion can occur without any demonstrable change in hepatocyte assembled microtubule or tubulin content and raise questions as to the role played by microtubules in hepatic VLDL secretion.

6691 EFFECT OF PORTACAVAL SHUNT ON LIPOPROTEINS AND AMINO ACIDS IN MONKEYS. (Eng.) Casali, R. E.; Nelson, C. A.; Read, R. C.; Campbell, G. S.; Morris, M. D. (Arkansas Sch. Medicine, Little Rock, AR). *Surg. Forum* 28:400-401; 1977.

To examine the effects of end-to-side portasystemic shunts (PCS) on total serum levels of cholesterol (C), triglycerides (T), α-lipoproteins (HDL), β-lipoproteins (LDL), and the ratio of branched-chain and aromatic amino acids (BCA/AA) in hypercholesterolemic cynomolgus monkeys, 13 monkeys were fed a diet containing 0.3 mg of C/kg/cal and 45% total calories as fat for 2 months. Then they were randomly distributed for sham operations or PCS after which serum levels of C, T, HDL, LDL, and BCA/AA were measured bimonthly. All of the animals survived and none has shown clinical signs of encephalopathy in 10 months of observation. There was no difference in total C, T, or LDL levels between the two groups. However, HDL levels were higher in animals with sham operations (33 mg/100 ml) than in animals with PCS (27 mg/100 ml), and the BCA/AA ratio was significantly lower ($p<0.001$) in animals with PCS (2.2 mg/100 ml, range 1.8-2.8 mg/100 ml) than in sham-operated animals (3.96 mg/100 ml, range 2.9-7.4 mg/100 ml). Each animal maintained a relatively constant BCA/AA ratio. In cynomolgus monkeys, PCS does not affect total serum levels of C, T, or LDL in dietary-induced hypercholesterolemia. The reduced ratio of BCA/AA in PCS was produced by a relative increase in AA with BCA remaining constant.

6692 DECREASE IN CHOLESTEROL AND PHOSPHOLIPID SECRETION INTO BILE INDUCED BY CHOLEPHILIC DYES IN HAMSTERS. (Fre.) Dumont, M.; Erlinger, S. (Hopital Beaujon, F 92118 Clichy Cedex, France). *Gastroenterol. Clin. Biol.* 1(11):891-896; 1977.

The effect of cholephilic anionic dyes on the biliary lipid secretion of anesthetized male golden hamsters was studied. Bile flow and bile salt outputs remained unchanged when BSP (76-80 nmol/min/100 g), phenol-3,6-dibromophthalein disulfonate (DBSP, 90-93 nmol/min/100 g), and indocyanine green (ICG, 23-27 nmol/min/100 g) were added to a perfusion of sodium taurocholate into the common bile duct. Phospholipids were significantly decreased by BSP (57.6%, $p<0.01$), DBSP (47.2%, $p<0.05$), and ICG (26.6%, $p<0.02$). Cholesterol output was also decreased by BSP (70.9%, $p<0.01$), DBSP (60.9%, $p<0.05$), and ICG (44.7%, not significant). Similarly, the cholesterol saturation index of bile was significantly decreased by BSP ($p<0.01$) and DBSP ($p<0.05$) but not significantly decreased by ICG. The decreases were registered within 30 min of adding the dyes to the perfusate, and values started to rise again as soon as the dyes were stopped. These results suggest that cholephilic anionic dyes interfere with phospholipid and cholesterol secretion into the bile, possibly by altering micelle formation, and not by preventing their synthesis.

6693 LACK OF ENTEROHEPATIC CIRCULATION OF INTACT BILIARY PHOSPHATIDYLCHOLINE IN THE RAT. (Eng.) Larsson, B.; Nilsson, A. (Medicinsk kemiska institutionen 4, Box 750, 220 07 Lund 7, Sweden). *Scand. J. Gastroenterol.* 13(3):273-275; 1978.

To determine the extent to which biliary phosphatidylcholine recirculates in bile, *in vivo*-labeled bile was obtained by injecting male white rats i.v. or i.p. with ^{14}C-palmitic acid or ^{3}H-palmitic acid mixed with an equimolar amount of KOH and 50-100 mg fat-free bovine serum albumin following bile duct cannulation. The infused radioactivity was recovered in phosphatidylcholine, chloroform-soluble compounds, and water:methanol-soluble compounds from bile collected over 6 hr, whether the injected compound was ^{14}C-palmitic acid (49.3 ± 5.5, 63.1 ± 5.4, and 36.9 ± 5.4%, resp.) or ^{3}H-palmitic acid (25.6 ± 7.7, 51.0 ± 17.4, and 49.0 ± 17.4%, resp.). When ^{3}H- and ^{14}C-labeled bile was infused intraduodenally into other rats prepared with bile fistulas, the average recovery of radioactivity in bile over 6 hr was 18.5 ± 8.8 and 8.4 ± 4.3%, resp., and the radioactivity recovered as phosphatidylcholine was 1.74 ± 0.80 and 0.10 ± 0.03%, resp. When ^{3}H-taurocholate was infused simultaneously with ^{14}C-bile, 68 ± 5.0% of the infused ^{3}H was recovered over 6 hr. Thus, the low recovery of biliary phosphatidylcholine was not due to disturbed enterohepatic circulation in the bile fistula rats. When ^{3}H-dipalmitoyl phosphatidylcholine was infused with the ^{14}C-bile, <0.2% of the infused ^{3}H was recovered as biliary phosphatidylcholine. Since the distribution of radioactivity in the labeled phosphatidylcholine molecules was not determined in the experiments with palmitic acid, the fate of the injected label cannot be stated. Hence, these results do not exclude a recirculation of phosphatidylcholine by a deacylation-reacylation cycle. The results do indicate that there is no significant enterohepatic circulation of intact bili-

ary phosphatidylcholine. This conclusion is at variance with previously published results of other authors.

6694 PROTEIN COMPOSITION OF RAT BILE. (Eng.) Kakis, G.; Yousef, I. M. (Dept. Pathology, Univ. Toronto, Toronto, Ontario M5S 1A8, Canada). *Can. J. Biochem.* 56(5):287-290; 1978.

To determine whether there is an association between biliary lipids and peptides or proteins, bile proteins were quantitated and identified in rats during the 48 hr following bile duct cannulation. Both total biliary protein secretion and the protein polypeptide profiles remained constant throughout the 48-hr period. The bile acids secreted in the first 5 hr contained 3-30% deoxycholic acid, ursodeoxycholic acid, and hyodeoxycholic acid. These bile acids disappeared thereafter, and the bile acids secreted consisted mainly of cholic acid and chenodeoxycholic acid. α-Muricholic, β-muricholic, and 3α,6-ketocholanic acid secretion continued throughout the experiment but was highest during the first 5 hr. Non-sodium dodecyl sulfate polyacrylamide gel electrophoresis of the biliary proteins secreted at various times showed seven major bands accounting for 90% of the total protein secreted. Sodium dodecyl sulfate polyacrylamide gel electrophoresis showed about 25 polypeptide bands, their molecular weights ranging from 12-140 x 10^3. These results show that protein secretion and protein polypeptide profiles remain constant, while bile acid secretion fluctuates markedly in both quantity and composition. It is concluded that biliary protein secretion is probably not related to the biliary secretion of bile acids.

6695 THE EFFECT OF DIETARY PROTEIN DEFICIENCY ON ALBUMIN SYNTHESIS AND ON THE CONCENTRATION OF ACTIVE ALBUMIN MESSENGER RIBONUCLEIC ACID IN RAT LIVER. (Eng.) Pain, V. M.; Clemens, M. J.; Garlick, P. J. (London Sch. Hygiene and Tropical Medicine, London WC1E 7HT, England). *Biochem. J.* 172(1):129-135; 1978.

A messenger-dependent rabbit reticulocyte lysate system was used to test the hypothesis that the decrease of liver albumin synthesis in humans and rats on protein-deficient diets is due to decreased availability of translatable messenger RNA (mRNA). COBS Wistar rats were divided into four groups according to the following dietary regimens: group I, complete; group II, protein-free for 9 days; group III, protein-free for 2 days; and group IV, protein-free for 9 days, then refed for 2 days with complete diet. By measuring the accumulation of i.v.-injected radioactive leucine in albumin immunoprecipitates, the proportion of albumin synthesis to total hepatic protein synthesis *in vivo* was established at 15%; the values for each of the groups were 14.6 ± 0.50, 7.98 ± 0.62, 8.34 ± 0.52, and 12.7 ± 0.65, for groups I, II, III, and IV, resp. ($p<0.001$ for II and III compared with I; $p<0.05$ for IV compared with I; $p<0.001$ for IV compared with II). In the messenger-dependent reticulocyte lysate system and also in the same lysate without nuclease pretreatment, synthesis of albumin and synthesis of total protein were measured as functions of the amount of total cytoplasmic hepatic mRNA added to the mixtures (up to 4 μg/50 μl). In the untreated system, the little or no response to added mRNA was attributed to the extensive protein synthesis on endogenous mRNA. In the messenger-dependent system, results were expressed in terms of radioactivity incorporated into albumin and into total protein per μg of RNA added; only the group II results were significantly different ($p<0.005$) from the controls (group I). Polyacrylamide gel analysis revealed that almost all of the radioactivity in the immunoprecipitate comigrated with an albumin marker. In liver samples from group II rats, the concentration of albumin RNA was half that found in samples from the group I rats. In group IV samples, however, increases in albumin mRNA levels produced by refeeding were not statistically significant; this and other discrepancies between the *in vivo* and *in vitro* results are discussed. The results suggest that the availability of specific mRNA species may well be responsible for the nutritional regulation of albumin synthesis, but it is not known whether the reduced availability of translatable mRNA is a primary effect of protein deprivation or a secondary effect at the level of translation or secretion.

6696 THE EFFECT OF PROSTHETIC GALLSTONES ON TOTAL BILE ACID POOL SIZE IN DOGS. (Eng.) Thurston, O. G.; McDougall, R. M.; Walker, K. (Dept. Surgery, Univ. Alberta, Edmonton, Alberta, Canada). *Surg. Gynecol. Obstet.* 146(6):911-913; 1978.

To determine whether the small bile acid pool characteristic of patients with cholesterol gallstones is responsible for gallstone formation or whether the reverse is true, the effect of prosthetic gallstones on total bile acid pool size was studied in dogs. The pool size was determined (by injecting ^{14}C-cholic acid) before and 28 days after the implantation of one or more polymeric silicone and/or glass spherical prostheses. The total bile acid pool size was reduced in 9 of 10 dogs after the implantation of the prostheses. The mean pool size fell from 4.25 ± 0.44 g to 2.91 ± 0.31 g ($p<0.01$). Sham cholecystectomy without prosthesis implantation also produced a small decrease in bile acid pool size but was significantly less than the decrease noted with prosthetic stones ($p<0.05$). Bile acid ratios (of cholic acid, chenodeoxycholic acid, and deoxycholic acid) did not change after implantation. These findings suggest that the small total bile acid pool size in patients with cholesterol stones is a phenomenon secondary to the pathologic state of the gallbladder.

6697 VITAMIN C AND GALLSTONE FORMATION: A PRELIMINARY REPORT. (Eng.) Jenkins, S. A. (Pye Res. Center, Walnut Tree Manor, Haughley Green, Suffolk IP14 3RS, England). *Experientia* 33(12):1616-1617; 1977.

An experiment was conducted to examine the relationships between vitamin C and gallstone formation. Male Dunkin-Hartley guinea pigs were fed a pelleted high cholesterol (0.5%) scorbutic diet for 5 weeks; 18 also received 0.5 mg L-ascorbic acid/day, p.o. (chronic hypovitaminosis C, group A) while 18 others received 5.0 mg L-ascorbic acid/day, p.o. (controls, group B). In group A, 14/18 animals survived at 5 weeks, had gained an average of 2.89 g, and all had gallstones, whereas in group B, 17/18 animals survived at 5 weeks, had gained an average of 25.67 g, and none had gallstones. The gallstones were found in the gallbladder and occasionally in the lumen of both the cystic and common bile ducts; the dried pooled gallstones weighed 18.96 mg, and 52.8% of this weight was cholesterol. The gallbladder bile of group A guinea pigs contained 8.99 ± 0.81 mM bile acids (BA) and 2.11 ± 0.12 mM cholesterol (C), values which were significantly different ($p<0.01$) from those of group B (14.54 ± 0.97 and 1.22 ± 0.17 mM for BA and C, resp.); however, the phospholipid (P) content was not significantly different between the two groups. Both the BA:C and P:C ratios in group A animals (4.4 and 3.7, resp.) were significantly different ($p<0.01$) from these ratios in group B animals (16.7 and 9.3, resp.), reflecting the higher C and lower BA content of group A bile. C is held in micellar solution in bile in combination with P and BA, and it has been postulated that the BA:C and P:C ratios determine the solubility of C rather than do absolute values. Thus, a lowering of these ratios favors the precipitation of C and provides a satisfactory explanation for gallstone formation in hypovitaminotic C guinea pigs.

6698 THE EFFECT OF ADRENALECTOMY UPON THE ABSORPTION, DISTRIBUTION AND METABOLISM OF ETHANOL IN THE RAT. (Eng.) Powis, G.; Cummings, J.; Morgan, E. (Dept. Pharmacology, Glasgow Univ., Glasgow G12 8QQ, Scotland). *Life Sci.* 21(7):1033-1036; 1977.

To determine whether an altered absorption, distribution, or metabolism might enhance the toxicity of ethanol in adrenalectomized animals, male albino Wistar rats were adrenalectomized, ethanol was administered (1.0 g/kg, i.v. or 0.8 g/kg, i.p.), and blood samples were drawn at regular intervals for ethanol determinations, which were compared with control values. There was no significant difference between the peak blood ethanol levels in controls (74.5 ± 5.0 mg/100 ml) and in short-term (2-4 days before ethanol treatment) adrenalectomized rats (82.2 ± 6.3 mg/100 ml); the peaks occurred at 30 min. The peak blood ethanol level in long-term (8-14 days before ethanol treatment) adrenalectomized rats occurred at 15 min and was significantly higher than the control value (118.4 ± 1.7 mg/100 ml, $p<0.01$). The rate of ethanol metabolism did not differ significantly among the three groups. However, when the volume of distribution of ethanol and of antipyrine (10 mg and 5 µCi/kg, i.v.) were determined to measure total body water, there was a 20% reduction in total body water ($p<0.05$) in the long-term adrenalectomized rats compared with the controls. An increased rate of ethanol absorption and the decrease in total body water produced the increase in peak blood ethanol levels in long-term adrenalectomized animals. These two factors must be considered in addition to altered renal function, changes in cellular permeability, and decreased hepatic metabolism as variables that could alter the action of drugs in cases of adrenal hypofunction.

6699 THE EFFECT OF CERTAIN ANAESTHETIC AGENTS ON THE ACTIVITY OF RAT HEPATIC δ-AMINOLAEVULINATE SYNTHETASE. (Eng.) Moore, M. R.; Parikh, R. K. (Univ. Glasgow Dept. Materia Medica and Therapeutics, Glasgow, Scotland). *Biochem. Soc. Trans.* 5(5):1473-1475; 1977.

The effect on rat hepatic δ-aminolevulinate synthetase (ALS) activity of various anesthetic agents was examined to determine if any of these drugs is porphyrinogenic. Rats were sacrificed after anesthetic treatment and their livers prepared for assay for ALS. The control level of ALS was 37.2 ± 15.2 nmol/hr/g of protein. Of 17 anesthetics tested, 7 caused increased ALS activity: thiopentone, 79.1 ± 20.0; methohexitone, 89.6 ± 28.3; althesin, 96.8 ± 22.6; chlordiazepoxide, 50.6 ± 12.4; pentazocine, 53.9 ± 13.0; ethrane, 53.8 ± 10.6; and methyoxyflurane, 53.3 ± 16.7 nmol/hr/g of protein. Barbiturate-based anesthetic drugs (thiopentone and methohexitone) could be expected to produce this effect based on previous evidence of porphyrinogenicity by barbiturates; a similar argument concerning steroids could explain the action of althesin. Pentazocine contains an allyl grouping, which is known to be porphyrinogenic in other compounds. The actions of chlordiazepoxide, methoxyfurane, and ethrane are difficult to explain; the former is known to inhibit electron transport and the second is known to cause hepatic artery spasm, which may play some part. Such porphyrinogenic drugs should be avoided in the anesthetic management of porphyric individuals.

6700 INVESTIGATION ON THE MORPHOKINETIC REACTIONS OF THE RAT LIVER TO ETHER ANAESTHESIA OF DIFFERENT DURATIONS. (Ger.) Hildebrand, R.; Rucker, P. (Anatomisches Institut, Vesaliusweg 2-4, D-4400 Munster, W. Germany). *Anaesthesia* 25(10): 481-485; 1976.

The volumes of cell nuclei were measured in the central, intermediate, and peripheral zones of the liver lobules of adult male albino rats (specific pathogen-free Wistar TNO W 70 strain) during diethylether anesthesia lasting 15, 40, or 80 min. The mean nuclear volume in the central zone of the liver lobule was 128.26 μm^3 in the untreated controls, 128.61 μm^3 after 15-min anesthesia, 123.65 μm^3 after 40-min anesthesia ($p<0.001$), and 139.14 μm^3 after 80-min anesthesia ($p<0.001$). In the intermediate zone, the mean nuclear volume was 163.74 μm^3 in the controls, 156.94 μm^3 after 15-min anesthesia, 163.56 after 40-min anesthesia, and 172.61 μm^3 after 80-min anesthesia ($p<0.001$). In the per-

ipheral zone of the hepatic lobule the mean nuclear volume was 129.73 μm^3 in the controls, and 114.09-121.36 μm^3 in the anesthetized groups ($p<0.001$). The results are interpreted by the typical distribution of cell organelles, enzymatic pathways, and metabolites in the different zones of the hepatic lobule. The intensity of the reaction and the onset of the diminution of the nuclear volume, indicating a functional depression and probably accentuated by a circulation-dependent low O_2 tension in the tissue, is interpreted in connection with different local concentrations of ether. An improvement of the blood flow by a locally increased metabolite level and an increased arterial influx presumably facilitate the recovery and favor a concentration-dependent induction of microsomal enzymes especially in the central zone of the hepatic lobule.

6701 STIMULATION OF LIVER REGENERATION BY CLOFIBRATE. (Eng.) Seifter, E.; Rettura, G.; Padawar, J.; Tolia, K.; Levenson, S. M. (Albert Einstein Coll. Medicine, Bronx, NY). *Surg. Forum* 28:395-397; 1977.

To examine the action of clofibrate, a compound known to produce nonfatty hepatomegaly, 32 adult male Sprague-Dawley rats were fed either a standard laboratory rat chow (groups 1A and 1B) or the same chow containing 2 g/kg clofibrate (groups 2A and 2B) for 3 days. Groups 1B and 2B were then subjected to 30% hepatectomy and groups 1A and 2A served as unoperated controls. Clofibrate increased liver size in controls (14.8 versus 12.6 g, $p<0.001$) and in the partially hepatectomized rats (13.4 versus 9.5 g, $p<0.001$). There were no changes in the proportions of liver protein, fat, or water due to clofibrate in either experimental or control rats. In a second experiment, 40 male Long-Evans rats were divided into 6 groups (2 with no surgery, 2 with sham operation, 2 with 30% hepatectomy with 1 group from each pair also receiving clofibrate). Clofibrate induced hepatomegaly in all three groups (liver weight 16.1 ± 1.0 versus 12.1 ± 0.6 g, 16.3 ± 0.6 versus 12.1 ± 0.4 g, and 14.0 ± 0.6 versus 10.7 ± 0.7 g, $p<0.003$, $p<0.001$, and $p<0.005$ for no surgery, sham operation, and partial hepatectomy, resp.). Clofibrate also increased the amounts of liver DNA, RNA, and protein and modestly increased the proportion of liver fat but did not increase the proportion of liver water in all three groups. It is hypothesized that clofibrate-induced hepatomegaly in normal animals occurs by an increase in cytoplasmic protein content, cell size, and either the number of nuclei/cell or the DNA content of the nuclei, whereas in partially hepatectomized rats, clofibrate causes a disproportionate increase in liver DNA, suggesting DNA synthesis or cell division.

6702 IN VIVO EFFECTS OF Escherichia coli ENDOTOXIN ON SULFOBROMOPHTHALEIN CLEARANCE IN THE GUINEA-PIG. (Eng.) Utili, R.; Abernathy, C. O.; Aron, S. A.; Zimmerman, H. J. (Veterans Admin. Hosp., Washington, DC 20422). *Experientia* 33(12): 1631-1632; 1977.

Since the incidence of cholestatic jaundice associated with gram-negative bacterial infections appears to be more prevalent in newborns than in adult humans, the effects of *Escherichia coli* endotoxin on the excretory processes of Hartley guinea pigs of different ages were studied. Lipopolysaccharide (LPS) from *E. coli* (35 µg/100 g) was administered i.p. to 1-, 3-, and 7-day-old animals, and 2 hr later, BSP (1.2 mg/100 g) was given by intracardiac injection. In saline-treated controls, BSP storage in the liver decreased between days 1 and 7, indicating maturation of hepatic conjugative processes. At 1 day, hepatic BSP accounted for about 21% of the applied dose, but at 3 and 7 days, only about 4%. In the experimental animals, LPS increased the percent BSP retention in the 1- and 3-day groups, but not in the 7-day group. At all ages, LPS caused an increased hepatic BSP storage, whether expressed in µg/g liver (136 ± 20, 95 ± 15, and 35 ± 6 µg/g liver in 1-, 3-, and 7-day-old animals, resp., versus 67 ± 20, 13 ± 3, and 14 ± 5 µg/g liver, resp., in controls) or as percentage of the applied dose (52 ± 5, 31 ± 5, and 11 ± 6%, resp., versus 21 ± 6, 4 ± 1, and 4 ± 5%, resp.). These results suggest that the primary effects of *E. coli* endotoxin on the hepatic clearance of BSP are at the excretory level.

6703 INFLUENCE OF SOME HEPATOTOXIC AGENTS ON HEPATIC GLUTATHIONE LEVELS IN MICE. (Eng.) Siegers, C. P.; Schutt, A.; Strubelt, O. (Medizinische Hochschule Lubeck, Lubeck, W. Germany). *Proc. Eur. Soc. Toxicol.* 18:160-162; 1977.

To determine whether hepatic glutathione (GSH) depletion is a reliable parameter of hepatotoxicity, hepatic levels of GSH and of oxidized GSH (GSSG) were determined in male NMRI mice 1 hr after p.o. treatment with CCl_4 (0.1 ml/kg), allyl alcohol (AA, 0.5 ml/kg), thioacetamide (TA, 50 mg/kg), dimethylnitrosamine (DMN, 150 mg/kg), bromobenzene (BB, 0.25 ml/kg), phenacetin (P, 1,000 mg/kg), and paracetamol (PA, 50 mg/kg), or after i.p. injection with diethylmaleate (DEM, 0.6 ml/kg). These levels were compared with those in controls (10 ml/kg saline, p.o.). The tested agents caused a depletion of hepatic GSH that, expressed as percentage decrease from control, amounted to 33.5% for CCl_4, 44.4% for AA, 26.8% for TA, 20.8% for DMN, 75.0% for BB, 60.1% for P, 90.1% for PA, and 81.6% for DEM. However, P and DEM did not induce hepatic lesions. The decreases in GSH levels were accompanied by corresponding decreases in GSSG levels. Pretreatment with DEM (0.6 ml/kg, i.p.) 1 hr prior to treatment with the hepatotoxins enhanced the toxicity of CCl_4, AA, BB, and PA as seen by the levels of serum enzymes (significant [$p=0.5$] increases in 2 of 3 measured enzymes in each case) and by enhanced mortality (2/12, 3/12, and 3/12 for AA, BB, and PA with DEM, resp., compared with 0/12 for each agent alone). DEM-induced GSH depletion is a useful experimental model to study the sensitivity of a GSH-depleted liver to hepatotoxic

agents. Depletion of hepatic GSH is not a reliable parameter of hepatotoxicity.

6704 RAT HEPATOCYTES AND SINUSOIDAL CELLS. SIMULTANEOUS ISOLATION AND ACTIVITY OF UREA CYCLE ENZYMES. (Eng.) Kreusch, J.; Hofmann, F.; Maier, K. P.; Decker, K. (Biochemisches Institut an der Medizinischen Fakultat der Universitat Freiburg, Hermann-Herder-Str. 7, D-7800 Freiburg, W. Germany). *Hoppe Seylers Z. Physiol. Chem.* 358(11): 1513-1516; 1978.

A method for the simultaneous isolation of rat hepatocytes and sinusoidal cells from the same liver was developed and used to study the hepatic metabolism of urea. Hepatocytes were obtained from the slow-speed sediment following collagenase treatment of livers from female Wistar rats. Sinusoidal cells were obtained from the hepatocyte supernatant by incubation with pronase. When the initial centrifugation was carried out at 37 x *g* instead of 50 or 100 x *g*, the proportion of sinusoidal cells in the supernatant was high enough for efficient isolation (the ratio of sinusoidal cells to hepatocytes was 15.5). The lesser proportion of hepatocytes in the supernatant permits shorter incubations (45 min) with lower concentrations (0.15%) of pronase than were previously needed, and this has the advantage of destroying fewer sinusoidal cells. The yield of sinusoidal cells was 13.7 ± 0.6 mg (wet weight) with 14 ± 3 hepatocytes/10^4 sinusoidal cells. The leakage of lactate dehydrogenase and glutamate dehydrogenase activities from sinusoidal cells into the medium after 20 min of pronase incubation was 37% and 32%, resp., of the activity in the medium and sediment. Measurements of the activities of urea cycle enzymes in these cells revealed that the activities of carbamoyl-phosphate synthetase, ornithine carbamoyltransferase, arginosuccinate synthetase, arginosuccinate lyase, and arginase were similar in both kinds of cells but that the activity of ornithine-oxo-acid transaminase was markedly higher in sinusoidal cells than in hepatocytes (11.8 ± 4.2 versus 2.7 ± 2.5 nmol/min/mg protein). The decreased yield of sinusoidal cells by this method compared with the previous method is balanced by the ability to isolate both hepatocytes and sinusoidal cells simultaneously from the same liver. The study also confirms a previous report that the synthesis of urea occurs in sinusoidal cells as well as in hepatocytes.

6705 EFFECT OF THIOACETAMIDE ON LIVER MITOCHONDRIAL ENZYMES--CARBAMYL-P-SYNTHETASE AND ORNITHINE TRANSCARBAMYLASE. (Eng.) Feijoo, B.; Cascales, C.; Cascales, M.; Santos-Ruiz, A. (Facultad de Farmacia, Madrid, Spain). *Proc. Eur. Soc. Toxicol.* 18:262-264; 1977.

To better understand the pathogenesis of liver diseases, changes in the enzymes of the urea cycle in rat liver were studied following thioacetamide administration (TAM, 50 mg/kg/day, i.p., for 24-30 days) in male Wistar rats and compared with control values. The levels of ammonia and urea (expressed as µmol of ammonia/g of liver) in the livers of TAM-treated rats (710 ± 146 and 7,188 ± 155, resp.) were significantly different from the levels in controls (285 ± 32 and 8,995 ± 115, resp., $p<0.01$ for both). TAM produced a significant decrease ($p<0.001$) in the activities of carbamyl-P-synthetase, ornithine transcarbamylase, and arginase compared with control values (0.65 ± 0.2 versus 2.55 ± 0.15, 67.2 ± 4.8 versus 161.1 ± 19.5, and 2,088 ± 229 versus 3,367 ± 269 µmol/mg protein/hr, resp.) and a significant increase in glutamate dehydrogenase activity compared with the control value (23.2 ± 2.4 versus 13.95 ± 2.24 µmol/mg protein/hr, $p<0.01$). These results indicate a significant disturbance of the urea cycle; the inhibition of the urea cycle leads to an increase in the level of ammonia, which inhibits 2-oxoglutarate formation and, hence, glutamate formation. Thus, both mechanisms by which a cell protects itself from the toxic effects of ammonia accumulation (the urea cycle and glutamine formation) are compromised.

6706 THE EFFECTS OF INTRAVENOUS SODIUM OCTANOATE ON THE RHESUS MONKEY. (Eng.) Rabinowitz, J. L.; Staeffen, J.; Aumonier, P.; Blanquet, P.; Vincent, J. D.; Daviaud, R.; *et al.* (Philadelphia Veterans Admin. Hosp., Philadelphia, PA). *Am. J. Gastroenterol.* 69(2):187-190; 1978.

Experience with sodium octanoate-induced coma in primates is presented to assess the role of octanoate in hepatic encephalopathy. Five adult female Rhesus monkeys received sodium octanoate (5 mM/kg using a 0.625 M solution in isoosmotic NaCl adjusted to pH 7.35 with HCl, i.v., over a 10-min period). Two minutes after the beginning of infusion, muscular hypotony developed in all animals followed by the appearance of sleep characterized by slow, high-amplitude encephalographic waves. Slow (12/min) myoclonic movements then developed involving the entire body but with predominant activity in the extremities. This phenomenon was followed by a period of approximately 10 min in which there was almost complete muscle atony as in paradoxical sleep without eye movement; the electroencephalogram (EEG) registered 1.5 cycle/sec rhythmical activity. This phase was followed by a period of nonrhythmical EEG paroxyms occurring with bi- or triphasic wave patterns. Neck muscle activity slowly reappeared, followed by rapid eye movement and delta waves. The polygraph returned to normal 40 min after the beginning of infusion, at which time the EEG became desynchronized. In 190 octanoate determinations performed in 24 control subjects and 79 patients with cirrhosis of whom 50 were in some stage of hepatic encephalopathy, arterial and venous concentrations of octanoate were significantly higher in cirrhotic patients than in controls ($p<0.01$) and in cirrhotic patients in coma than in cirrhotic patients not in coma ($p<0.05$). Serum octanoate levels in cirrhotic patients were frequently above 10 µEq/l with a maximum level of 18 µEq/l (normal value, <5 µEq/l with a mean value of 1.5 µEq/l). In comatose patients, there appeared to be a correlation between blood octanoate and ammonia levels.

It remains uncertain as to whether elevated serum octanoate level is a causative factor of hepatic encephalopathy or an incidental finding resulting from serious hepatic disease.

6707 THE RELATIONSHIP BETWEEN MEMBRANE POTENTIAL AND ATP CONTENT IN RAT LIVER DURING ISCHEMIA. (Eng.) Shiba, Y.; Muneoka, Y.; Kanno, Y. (Sch. Dentistry, Hiroshima Univ., 2-3 Kasumi 1 Chome, Hiroshima 734, Japan). *Experientia* 15(1): 57-58; 1978.

To determine whether the decrease in the membrane potential of the liver caused by ischemia is explained by the ATP-depleting effect of ischemia, the effects of ischemia on the membrane potential and ATP content in the livers of ethionine-treated and untreated female Donryu rats were investigated. Ischemia was induced by occluding both the portal vein and common hepatic artery. DL-ethionine (75 mg/100 g) was injected i.p. 5.5 hr before ischemia was induced. The membrane potential and ATP content in the livers of untreated rats were -52.4 ± 3.6 mV and 2.43 ± 0.25 μmol/g wet liver, resp. These values decreased to -43.8 ± 4.4 mV and 0.44 ± 0.13 μmol/g wet liver, resp., in the ethionine-treated rats. Both ischemia and ethionine decreased the membrane potential and ATP content. In ethionine-treated liver, ischemia brought about a further significant decrease in membrane potential ($p<0.01$) without a significant decrease in ATP content ($0.1< p<0.2$). The results suggest that the decrease in the membrane potential by ischemia cannot be fully explained by its ATP-depleting effect.

6708 THE ACUTE PHASE RESPONSE TO INJURY AND ITS RELATIONSHIP TO CHANGES IN ENDOPLASMIC RETICULUM OF RAT LIVER. (Eng.) Turchen, B.; Jamieson, J. C.; Huebner, E.; Van Caeseele, L. (Dept. Chemistry, Univ. Manitoba, Winnipeg, Manitoba R3T 2N2, Canada). *Can. J. Zool.* 55(9):1567-1571; 1977.

The ultrastructural changes that accompanied the acute phase response of serum proteins to experimental liver injury were investigated in male rats. The rats received an s.c. injection of either turpentine (0.5 ml/100 g) or 0.15 M NaCl and were killed 8, 12, 24, or 48 hr later. The induction of the acute phase response to injury was accompanied by dilation and loss of the regular structural features of the endoplasmic reticulum membranes. There were numerous circular or oval vesicles of rough and smooth endoplasmic reticulum. In most livers, there appeared to be increases in the amounts of smooth endoplasmic reticulum and Golgi complex relative to rough endoplasmic reticulum. These changes were present in all experimental animals, but were most noticeable in those with injury for 12-24 hr. The mean levels of sialyltransferase, galactosyltransferase, protein, RNA, phospholipid, protein-bound sialic acid, protein-bound galactose, albumin, and α_1-acid glycoprotein in the experimental animals at 24 hr (1,170 pmol/hr/mg protein [sialic acid transferred], 780 pmol/hr/mg protein [galactose transferred], 31.6 mg/g wet weight liver, 5.2 mg/g wet weight liver, 9.7 mg/g wet weight liver, 34.7 μg/g wet weight liver, 23.8 μg/g wet weight liver, 308.0 μg/g wet weight liver, and 280.0 μg/g wet weight liver, resp.) were increased in comparison with the levels in controls (650 pmol/hr/mg protein, 480 pmol/hr/mg protein, 27.8 mg/g, 4.8 mg/g, 7.2 mg/g, 25.5 μg/g, 18.0 μg/g, 389.0 μg/g, and 78 μg/g, resp.). It is suggested that the ultrastructural and biochemical changes in the liver result in part from an increased demand for liver synthesized glycoproteins.

6709 LONG-TERM EFFECT OF ARTERIALIZATION OF THE PORTAL VEIN ON THE SINUSOIDAL PRESSURE IN DOGS WITH PORTACAVAL SHUNT. (Eng.) Arif, S.; Butt, K.; Dennis, C.; Lam, A.; Minkowitz, S.; Babich, A.; *et al.* (Downstate Medical Center, State Univ. New York, Brooklyn, NY). *Surg. Forum* 28:406-407; 1977.

Arterial flow into the portal vein after arterialization of the intrahepatic portal vein following portacaval shunt was monitored, and excessive perfusion was prevented by the choice of a small arteriovenous fistula, to determine the sinusoidal pressure in a chronic dog preparation. The hepatic vein wedge pressure (sinusoidal pressure) was determined manometrically preoperatively and at 2 weeks, 6 months, and 12 months postoperatively, and thereafter at 12- to 20-month intervals. In control dogs (portacaval shunt only), the mean preoperative sinusoidal pressure was 18.3 cm of saline; a slight decrease was observed after 2 weeks (16.4 cm), and in one dog that survived 6 months, the pressure was 12 cm. In 17 experimental dogs, the mean preoperative sinusoidal pressure was 17.4 cm of saline, and no abnormal elevations were seen during 56 months of follow-up. No significant changes in portal flow were observed up to 48 months, except in one animal in which a 2.63-fold increase in flow was measured after 24 months. The sinusoidal pressure did not change in this experimental preparation because the volume of blood entering the sinusoidal bed was similar to normal portal vein flow. Because the hemodynamics of the sinusoidal bed remained essentially unchanged, there was no damage to hepatic parenchyma.

6710 ENHANCEMENT OF THE ANTI-ANABOLIC RESPONSE TO ADENOSINE 3':5'-CYCLIC MONOPHOSPHATE DURING DEVELOPMENT: THE INHIBITION OF HEPATIC PROTEIN SYNTHESIS. (Eng.) Klaipongpan, A.; Bloxham, D. P.; Akhtar, M. (Dept. Physiology, Univ. Southampton, Southampton SO9 3TU, England). *Biochem. J.* 168(2):271-275; 1977.

6711 s-ADENOSYLMETHIONINE METABOLISM AND ITS RELATION TO POLYAMINE SYNTHESIS IN RAT LIVER: EFFECT OF NUTRITIONAL STATE, ADRENAL FUNCTION, SOME DRUGS AND PARTIAL HEPATECTOMY. (Eng.) Eloranta, T. O.; Raina, A. M. (Dept. Biochemistry, Univ. Kuopio, P.O. Box 138, SF-

70101 Kuopio 10, Finland). *Biochem. J.* 168(2): 179-185; 1977.

6712 PHARMACOKINETICS OF ^{14}C-DEMETHYLATION BREATH TESTS ANALYSED WITH GLYCODIAZINE AS MODEL SUBSTANCE [Abstract]. (Eng.) Bircher, J.; Platzer, R.; Karlaganis, G.; Galeazzi, R. L. (Dept. Clinical Pharmacology, Univ. Berne, Berne, Switzerland). *Digestion* 16(4):352-353; 1977.

6713 AN ELECTRICAL METHOD OF MEASUREMENT OF THE EXTRACELLULAR SPACE OF THE LIVER [Abstract]. (Eng.) Lambotte, L.; Wojcik, S. (Universite Catholique de Louvain, Laboratoire de Chirurgie Experimentale, Brussels, Belgium). *Digestion* 16(4):333; 1977.

6714 EFFECT OF BILE FLOW ON THE BILIARY REABSORPTION OF ^{35}S-SULFOBROMOPHTHALEIN SODIUM (^{35}S-BSP) FROM THE RAT BILIARY TREE [Abstract]. (Eng.) Dammann, H. G.; Butzow, G. H.; Grasedyck, K. (First Medical Clinic, Univ. Hamburg, Hamburg, W. Germany). *Digestion* 16(4): 341-342; 1977.

6715 HETEROGENEOUS RECIPROCAL LOCALIZATION OF FRUCTOSE-1,6-BIS-PHOSPHATASE AND OF GLUCOKINASE IN MICRODISSECTED PERIPORTAL AND PERIVENOUS RAT LIVER TISSUE. (Eng.) Katz, N.; Teutsch, H. F.; Jungermann, K.; Sasse, D. (Biochemisches Institut, Albert-Ludwigs-Universitat, D-7800 Freiburg, W. Germany). *FEBS Lett.* 83(2): 272-276; 1977.

6716 METABOLISM OF 2-DEOXY-D-GALACTOSE IN LIVER INDUCES PHOSPHATE AND URIDYLATE TRAPPING. (Eng.) Starling, J. J.; Keppler, D. O. R. (Univ. Florida Coll. Medicine, Gainesville, FL 32610). *Eur. J. Biochem.* 80(2):373-379; 1977.

6717 AUXILIARY LIVER TRANSPLANTATION IN THE RAT, INFLUENCE OF THE CONDITION OF THE RECIPIENT'S LIVER ON THE FATE OF THE GRAFT. (Eng.) Hess, F.; Willemen, A.; Jerusalem, C. (Lab. Cytology and Histology, Univ. Nijmegen, Geert Grooteplein Noord 21, Nijmegen, Netherlands). *Eur. Surg. Res.* 9(4):270-279; 1977.

6718 EFFECT OF DIETARY FATS ON OXIDATIVE PHOSPHORYLATION AND FATTY ACID PROFILE OF RAT LIVER MITOCHONDRIA. (Eng.) Divakaran, P.; Venkataraman, A. (Univ. Texas Medical Sch. at Houston, P.O. Box 20708, Houston, TX 77025). *J. Nutr.* 107(9):1621-1631; 1977.

6719 METABOLISM OF PROTEIN AND RNA IN LIVER OF RATS DEPRIVED OF TRYPTOPHAN. (Eng.) Bocker, R.; Jones, I. K.; Kersten, W. (Institut fur Physiologische Chemie, Universitat Erlangen-Nurnberg, Wasserturmstrasse 5, 8520 Erlangen, W. Germany). *J. Nutr.* 107(9):1737-1746; 1977.

6720 ALTERATIONS IN NICOTINAMIDE AND ADENINE NUCLEOTIDE SYSTEMS DURING MIXED-FUNCTION OXIDATION OF p-NITROANISOLE IN PERFUSED LIVERS FROM NORMAL AND PHENOBARBITAL-TREATED RATS. (Eng.) Kauffman, F. C.; Evans, R. K.; Thurman, R. G. (Univ. Maryland Sch. Medicine, Baltimore, MD 21201). *Biochem. J.* 166(3):583-592; 1977.

6721 IMMUNITY AND IMMUNOPATHOLOGY FOLLOWING REINFUSION OF MICE CURED OF CHRONIC SCHISTOSOMIASIS MANSONI. (Eng.) Warren, K. S.; Pelley, R. P.; Mahmoud, A. A. F. (Dept. Medicine, Case Western Reserve Univ., Cleveland, OH 44106). *Am. J. Trop. Med. Hyg.* 26(5, Part 1):957-962; 1977.

6722 CYTOCHROME P-450 IN BIOLOGICAL HYDROXYLATIONS IN THE LIVER. (Eng.) Trulzsch, D. (Luitpold-Krankenhaus, Josef-Schneider-Str. 2, D-8700 Wurzburg, W. Germany). *Acta Hepatogastroenterol. (Stuttg.)* 24(4):302-306; 1977.

6723 SHORT-TERM HORMONAL CONTROL OF FAT METABOLISM IN THE LIVER. (Eng.) Hems, D. A. (St. George's Hosp. Medical Sch., London SW17 0QT, England). *Biochem. Soc. Trans.* 5(4):886-890; 1977.

6724 THE INFLUENCE OF THYROID STATE ON GLYCEROL-INDUCED HYPERPOLARIZATION OF THE CELL MEMBRANES IN ISOLATED, PERFUSED RAT LIVER. (Eng.) Sestoft, L.; Folke, M.; Bartels, P. D.; Gammeltoft, S.; Kristensen, L. O. (Hvidore Hosp., Emiliekildevej, DK-2930 Klampenberg, Denmark). *Biochim. Biophys. Acta* 469(2):163-170; 1977.

6725 THE EFFECT OF PHENOXYBENZAMINE AND SARALASIN ON THE ALTERED RENAL BLOOD FLOW DISTRIBUTION IN BABOONS WITH OBSTRUCTIVE JAUNDICE. (Eng.) Bomzon, L.; Kew, M. C.; Rosendorff, C. (Univ. Witwatersrand, Medical Sch., Hospital St., Hillbrow, Johannesburg, South Africa). *Clin. Exp. Pharmacol. Physiol.* 4(4): 365-373; 1977.

6726 INCREASED HEPATIC PRODUCTION OF α-AMINO-n-BUTYRIC ACID AFTER CHRONIC ALCOHOL CONSUMPTION [Abstract]. (Eng.) Shaw, S.; Lieber, C. S. (Bronx Veterans Admin. Hosp., Bronx, NY). *Gastroenterology* 73(5):1246; 1977.

6727 METHANETHIOL INHIBITION OF MITOCHONDRIAL RESPIRATION. (Eng.) Waller, R. L. (Dept. Physiology, Case Western Reserve Univ., Cleveland, OH 44106). *Toxicol. Appl. Pharmacol.* 42(1):111-117; 1977.

6728 LIVER GLYCOGEN STORAGE DISEASE IN AN INBRED STRAIN OF RATS. (Eng.) Malthus, R. S.; Clark, D. G. (Univ. Otago Medical Sch., Otago, New Zealand). *Proc. Univ. Otago Med. Sch.* 55(2):31-32; 1977.

6729 EFFECT OF BOVINE SERUM ALBUMIN ON THE FUNCTIONAL CHARACTERISTICS OF ISOLATED PERFUSED RAT LIVER. (Eng.) Groufsky, A. K.; Holland, R. K.; Lee, D. (Univ. Otago Medical Sch., Otago, New Zealand). *Proc. Univ. Otago Med. Sch.* 55(2):26-27; 1977.

6730 Schistosoma mansoni: CHOLESTERYL ESTER PROFILES OF PLASMA AND LIVER IN EXPERIMENTALLY INFECTED MICE. (Eng.) De Oliveira, D. N. G.; De M. Costa, J. C. (Departamento de Bioquimica, Universidade Federal de Pernambuco, 50,000 Recife, Pernambuco, Brazil). *Exp. Parasitol.* 43(1):244-247; 1977.

6731 CYTOCHEMICAL LOCALIZATION OF GLUCOSE 6-PHOSPHATASE ACTIVITY IN THE LIVER OF GROWING MICE AFTER PHENOBARBITAL TREATMENT. (Eng.) Kanamura, S.; Ogawa, K. (Kansai Medical Univ., Moriguchi, Osaka 570, Japan). *Acta Histochem. Cytochem.* 10(2):204-216; 1977.

6732 OPPOSITE CHANGES IN RAT LIVER GLUCOSE-6-PHOSPHATE DEHYDROGENASE DURING AGING IN SPRAGUE-DAWLEY AND FISCHER 344 MALE RATS. (Eng.) Wang, R. K. J.; Mays, L. L. (Dept. Biology, Occidental Coll., Los Angeles, CA 90041). *Exp. Gerontol.* 12(3/4):117-124; 1977.

6733 EFFECT OF VITAMIN A NUTRITIONAL STATUS ON THE RIBONUCLEIC ACIDS OF LIVER, INTESTINAL MUCOSA AND TESTES OF RATS. (Eng.) Jayaram, M.; Ganguly, J. (Dept. Biochemistry, Indian Inst. Science, Bangalore-560012, India). *Biochem. J.* 166(3):339-366; 1977.

See also, 6576, 6621, 6622, 6625, 6670, 6747, 6748, 6769, 6785, 6800, 7068, 7090, 7094, 7106, 7150, 7207, 7208, 7209, 7210.

SECRETION AND METABOLISM

Intestine

6734 DISTRIBUTION OF INTRINSIC NERVE CELL BODIES AND AXONS WHICH TAKE UP AROMATIC AMINES AND THEIR PRECURSORS IN THE SMALL INTESTINE OF THE GUINEA-PIG. (Eng.) Furness, J. B.; Costa, M. (Sch. Medicine, Flinders Univ., Bedford Park, South Australia, 5042, Australia). *Cell Tissue Res.* 188(3): 527-543; 1978.

The sites of uptake, decarboxylation, and retention of L-dopa and the uptake and retention of dopamine and 6-hydroxytryptamine in the guinea pig small intestine were localized histochemically with a fluorescence technique for arylethylamines. In ileal segments from untreated guinea pigs, only noradrenergic axons were fluorescent; these axons were eliminated by surgical denervation (crushing nerves running to the intestine through the mesentery) or by chemical denervation with 6-hydroxydopamine (300 mg/kg and 200 mg/kg, s.c., 1 week apart). In denervated segments of ileum, cell bodies and processes of intrinsic neurons became fluorescent after the injection of l-dopa (175 mg/kg), dopamine (20-200 mg/kg), or 6-hydroxytryptamine (20-100 mg/kg) and the inhibition of monoamine oxidase, as did cells of Brunner's glands and Paneth cells. About 11% of the nerve cell bodies in the submucous plexus and 0.4% of those in the myenteric plexus became fluorescent. Varicose intrinsic axons that took up amines were found among the nerve cell bodies of the myenteric and submucous plexuses. They also ramified in the principal connections of the plexuses, in the tertiary strands of the myenteric plexus, in the deep muscular plexus, and contributed sparse supplies of axons to arterioles in the submucosa and to the lamina propria of the mucosa. The axons were resistant to the degenerative actions of 6-hydroxydopamine. It is suggested that the intrinsic amine handling axons are more likely to utilize an indolamine related to 5-hydroxytryptamine than they are to utilize a catecholamine as a neurotransmitter.

6735 ACID RELEASES MOTILIN FROM HUMAN DUODENUM IN VITRO. (Eng.) Strunz, U.; Mitznegg, P.; Domschke, W.; Subramanian, N.; Domschke, S.; Wunsch, E. (Dept. Medicine, Univ. Erlangen-Nurnberg, Erlangen, W. Germany). *Acta Hepatogastroenterol. (Stuttg.)* 24(6):456-457; 1977.

The effects of hydrochloric acid and sodium hydrox-

ide on human duodenal mucosa were studied using an *in vitro* perfusion technique to investigate the stimuli for motilin release. Motilin was measured by a sensitive and specific radioimmunoassay. The pH of the perfusate was adjusted either to pH 2 by addition of 1 N HCl or to pH 12 by addition of 1 N NaOH, and samples of the effluent were taken at timed intervals. The tissue was obtained from patients undergoing gastrectomy for chronic ulcer disease or gastric cancer. Under basal conditions (pH 7.5), 2.2 ± 0.3 fmol motilin/min/100 mg tissue were released into the medium. Alkalinization completely abolished this release. Acidification caused a peak release of 31.7 ± 3.1 fmol motilin/min/100 mg tissue after 1 min. Motilin levels remained markedly elevated for 40 min, whereas the pH returned to 7.5 within 2 min after addition of the acid. It is concluded that motilin secretion can be stimulated *in vitro* and that this perfusion system may be useful in studying the mechanism of gastrointestinal hormone release.

6736 INTESTINAL DISACCHARIDASES IN NEWBORN AND MOTHER RATS: EFFECT OF DIETARY PROTEIN DEFICIENCY DURING PREGNANCY. (Eng.) Younoszai, M. K.; Swanson, J. D., Jr.; Ranshaw, J. (Coll. Medicine, Univ. Iowa, Iowa City, IA 52242). *Am. J. Clin. Nutr.* 31(6):931-937; 1978.

Small intestinal growth and disaccharidase activity were studied in mother rats fed a protein-deficient diet during pregnancy and in the pups. Pups were delivered at term, by cesarean section, from control (CP) and test (TP) rats. The diets fed during pregnancy contained 26% casein (CP rats) or 6% casein (TP rats). At birth, body weight and small intestinal length and weight were significantly lower in pups of TP than in those of CP rats ($p<0.01$). Specific activity of lactase in the small intestine was similar in the two groups of pups (mean 106 versus 116 μmol lactose hydrolyzed/min/g protein). However, total activity of lactase in the entire small intestine was significantly lower in the pups of TP than in those of CP rats ($p<0.01$). In the mothers, the weight of the small intestine in TP rats was almost half that in the CP rats (3.7 versus 7.6 g). In the mucosal scrapings of distal third of the small intestine, specific activities of the disaccharidases were significantly greater in TP than in CP rats (lactase, 15.0 versus 6.2; sucrase, 39 versus 21; maltase, 250 versus 152 μmol substrate hydrolyzed/min/g protein of mucosal homogenate). In the proximal third of the small intestine, only maltase activity was significantly ($p<0.05$) different (lactase, 12.0 versus 10.8; sucrase, 76 versus 61; maltase, 350 versus 258 μmol/min/g). Total activities of the disaccharidases in the small intestine were significantly lower ($p<0.05$) in the TP than CP rats (lactase, 4.0 versus 6.4; sucrase, 15 versus 28; maltase, 74 versus 125 μmol hydrolyzed/min, by mucosal scrapings of the entire intestine). This study did not indicate that in the small intestine specific activity of lactase was lower in the growth retarded than in the controls. However, total activity of lactase in the entire small gut was significantly lower because of the small size of the intestine in the former group.

6737 LACTASE ENZYMES IN THE INTESTINAL BRUSH BORDER MEMBRANE OF THE SUCKLING RAT: A SECOND ENZYME RESTRICTED TO ILEUM. (Eng.) Green, J. R.; Hauri, H. P. (Univ. Children's Hosp., 3010 Bern, Switzerland). *FEBS Lett.* 84(2):233-235; 1977.

A specific assay for brush border membrane lactase was used to study the small intestine of 1- to 28-day-old rats. This study confirmed the developmental differences in lactase activity reported in other studies. Lactase activity in the distal small intestine increased from an initial low level to reach a peak between days 8 and 16, after which it decreased and was totally absent by day 28; activity in the proximal intestine showed little change until day 16 when it began to fall to approach adult values by day 28. The possibility that the proximal and distal lactases are not identical molecules was investigated by gel electrophoresis. A comparison of the protein and enzyme patterns showed that the lactase activity of suckling rats comigrates with a major protein band of relative front (R_F) 0.277 for the proximal enzyme and R_F 0.242 for the distal one. To locate more precisely the change-over point between the proximal and distal lactases, the small intestines from rats aged 12, 14, 19, and 23 days were divided into eight sections of equal length and the brush border membrane proteins analyzed. From the R_F values, it was possible to classify the enzyme present in sections 1-6 as the proximal type and that in sections 7 and 8 as the distal type. In no section was the simultaneous presence of the two forms of the enzyme observed, and there was no evidence for a gradual change in mobility of any of the bands that would be expected if the observed differences were due to intraluminal proteolysis of a proximal protein to produce an electrophoretically faster distal form. The results demonstrate that there is a second type of lactase molecule restricted to the distal small intestine of the suckling rat.

6738 EFFECT OF ALLOXAN-INDUCED DIABETES ON INTESTINAL PEPTIDASES IN THE RAT. (Eng.) Arvanitakis, C.; Folscroft, J.; Stitt, G. (Kansas Univ. Sch. Medicine, Kansas City, KS 66103). *Endocrinology* 102(4):1118-1121; 1978.

Inasmuch as amino acid transport is increased in diabetes and intestinal peptidases are important enzymes in the digestion and absorption of peptides and amino acids, the effect of experimental diabetes on representative membrane-bound and cytoplasmic peptidases was examined in the rat small intestine. Male Holtzman rats received either alloxan monohydrate (40 mg/kg) or normal saline (control) i.v., and 24-hr urine was collected and tested for glucose. Persistent glucosuria, hyperglycemia (blood glucose >250 mg/dl), and weight loss were the criteria for diabetes. There was no significant difference in daily food intake be-

tween the groups. On day 7 after treatment, the rats were sacrificed, and proximal and distal halves of the entire small intestinal mucosa were processed to obtain brush border and cytosol-fraction enzymes. Alloxan diabetes significantly increased the wet weight of the mucosal scrapings and total mucosal protein in both the proximal (from 2.25 ± 0.2 to 3.15 ± 0.4 g and from 0.214 ± 0.02 to 0.359 ± 0.02 g, resp., $p<0.01$) and distal segments (from 1.59 ± 0.2 to 2.26 ± 0.3 g and from 0.189 ± 0.01 to 0.268 ± 0.02 g, resp., $p<0.025$ and $p<0.05$, resp.). When the activities of leucyl-naphthylamidase (LNA), leucyl-glycine hydrolase (LGH), and prolyl-glycine hydrolase were assayed, there were no significant differences in cytosol fraction activities between control and diabetic rats, but the total and specific activities of LNA and LGH were significantly increased in both the proximal ($p<0.02$ and $p<0.05$, resp., for LNA; $p<0.05$ and $p<0.05$, resp., for LGH) and distal segments ($p<0.02$ and $p<0.02$, resp., for LNA; $p<0.05$ and $p<0.05$, resp., for LGH). The results demonstrate that peptidase activities of the intestinal brush border but not of the cytoplasm are increased in experimental diabetes throughout the small intestine in the rat and that the increase is not due to dietary factors.

6739 UREASE AS A CONTRIBUTING FACTOR IN ULCERATIVE LESIONS OF THE COLON. (Eng.) LeVeen, E. G.; Falk, G.; Ip, M.; Mazzapica, N.; LeVeen, H. H. (State Univ. New York, 450 Clarkson Ave., Brooklyn, NY 11203). *Am. J. Surg.* 135(1):53-56; 1978.

Studies were carried out in dogs to determine whether ammonia is involved in the pathogenesis of colonic ulcerations in uremia. Bilateral nephrectomies or ureteral ligations were performed in 16 dogs, and 8 were immunized with enzymatically inactive urease and tested for the presence of antibodies on an Ouchterlony plate. The serum was also tested chemically to see whether it inhibited the enzymatic conversions of urea to ammonia. Massive hemorrhagic ulcerative colitis was found in six of the eight control dogs that underwent one of the operations, and all died before the sixth postoperative day. All immunized dogs were alive and well 5 days after nephrectomy, and the gastrointestinal tracts were grossly and histologically normal. The mean blood urea nitrogen level for the immunized group was 410 mg/100 ml at the time of sacrifice and 285 mg/100 ml in the nonimmunized animals just prior to death. Portal vein ammonia levels increased in the controls but did not increase significantly in the immunized animals. These results prove that the colonic ulcerations seen in uremia are the result of excessive colonic ammonia production.

6740 DIGESTION OF CERTAIN FRACTIONS OF DIETARY FIBER IN HUMANS. (Eng.) Holloway, W. D.; Tasman-Jones, C.; Lee, S. P. (Auckland Hosp., Auckland, New Zealand). *Am. J. Clin. Nutr.* 31(6):927-930; 1978.

Studies were carried out to determine if there is cellulose, hemicellulose, or lignin digestion in the human small or large bowel. Six healthy subjects with an ileostomy and 10 normal subjects were studied. Both were put on a fixed diet of known cellulose, hemicellulose, and lignin content. From the feces excreted, the fiber components were measured by the acid and neutral detergent method. From the small bowel, 84.5% of the ingested cellulose was excreted from the ileostomy subjects. From the normal subjects, 22.4% of the ingested cellulose was excreted, indicating that approximately 80% of the cellulose was digested in the large bowel of normal subjects. Of the water insoluble ingested hemicellulose, 27.5% was excreted from the small bowel of the ileostomized patients and 4.0% was excreted by the large bowel of the normal subjects. There is thus approximately 96% digestion of hemicellulose in normal subjects. Lignin was not digested by the small or large bowel. These studies indicate that hemicellulose and cellulose are both digested, mainly in the small intestine in the former case and in the large intestine in the latter case. Hemicelluloses may contribute significantly to the caloric value of foods. Since cellulases are not present in human digestive juices, fiber digestion is probably by intestinal bacteria.

6741 SYNTHESIS OF PLASMALEMMAL GLYCOPROTEINS IN INTESTINAL EPITHELIAL CELLS: SEPARATION OF GOLGI MEMBRANES FROM VILLUS AND CRYPT CELL SURFACE MEMBRANES; GLYCOSYLTRANSFERASE ACTIVITY OF SURFACE MEMBRANE. (Eng.) Weiser, M. M.; Neumeier, M. M.; Quaroni, A.; Kirsch, K. (Harvard Medical Sch., Boston, MA 02114). *J. Cell Biol.* 77(3):722-734; 1978.

The relationship between Golgi and cell surface membranes of intestinal cells with respect to glycosyltransferase activities was studied. These membranes were isolated from intestinal crypt cells and villus cells. The villus cell membranes consisted of microvillus membrane, a Golgi-rich fraction, and two membrane fractions interpreted as representing lateral-basal membranes. The villus cell microvillus membrane was purified by previously published techniques, while the other membranes were obtained from isolated cells by differential centrifugation and density gradient velocity sedimentation. The two membrane fractions obtained from villus cells and considered to be lateral-basal membranes were enriched for Na^+,K^+-ATPase activity, but one also showed enrichment in glycosyltransferase activity. The Golgi membrane fraction was enriched for glycosyltransferase activity and had low to absent Na^+,K^+-ATPase activity. Adenylate cyclase activity was present in all membrane fractions except the microvillus membrane but copurified with Golgi rather than lateral-basal membranes. Electron microscopy showed that the Golgi fraction consisted of variably sized vesicles and cisternalike structures. The two lateral-basal membrane fractions showed only vesicles of smaller, more uniform size. After ^{125}I labeling of isolated intact cells, radioactivity was found to be associated with the lateral-basal and microvillus membrane fractions and not with the Golgi fraction. Antibody prepared

against lateral-basal membrane fractions reacted with the surface membrane of isolated villus cells. The membrane fractions from isolated crypt cells demonstrated that all had high glycosyltransferase activity. The data show that glycosyltransferase activity, in addition to its Golgi location, may be a significant property of the lateral-basal portion of the intestinal villus cell plasma membrane. Data obtained with crypt cells support earlier data and show that the crypt cell surface membrane possesses glycosyltransferase activity.

6742 STUDIES ON TRANSLOCATION OF IMMUNOGLOBULINS ACROSS INTESTINAL EPITHELIUM. III. FAILURE OF CHOLERA ENTEROTOXIN TO STIMULATE SECRETION OF IgA BY RABBIT INTESTINE. (Eng.) Borthistle, B. K.; Isobe, K.; Brown, W. R. (Univ. Oregon Medical Center, 3181 S.W. Sam Jackson Park, Portland, OR 97201). *Am. J. Dig. Dis.* 23(2):134-136; 1978.

To test the hypothesis that secretion of IgA into intestinal fluids is modulated by increases in epithelial cell cyclic AMP (cAMP) levels, purified cholera enterotoxin (10 µg to 1 mg) was instilled into jejunal loops of adult New Zealand white rabbits for 10 min, after which fluid was collected from each loop at hourly intervals for 8 hr. The levels of IgA in these specimens were compared to those in specimens from saline-treated controls by radial immunodiffusion. The fluid collected from 10-µg toxin-stimulated loops was about fivefold that from control loops (10.6 ± 1.0 versus 2.0 ± 0.5 ml/8 hr). At higher toxin doses, there was no increase in fluid response. The total amount of IgA collected from the 10-µg toxin-stimulated loops and from the control loops was similar (21.2 ± 5.1 versus 19.5 ± 3.7 mg/g loop/8 hr) and did not increase at higher toxin doses; hence, the IgA concentration fell in toxin-stimulated loops due to the increase in fluid secretion. The results suggest that the transepithelial transport of IgA into the intestinal lumen is not modulated by cholera-toxin induced increases in intraepithelial cell cAMP, but it is not possible to conclude that intestinal secretion of IgA is never modulated by increases in epithelial cell cAMP.

6743 MICROPROBE MEASUREMENT OF Na, K, AND Cl CONCENTRATION PROFILES IN EPITHELIAL CELLS AND INTERCELLULAR SPACES OF RABBIT ILEUM. (Eng.) Gupta, B. L.; Hall, T. A.; Naftalin, R. J. (Biological Microprobe Lab., Cambridge, England). *Nature* 272(5648):70-73; 1978.

Electron microprobe x-ray analysis of frozen-hydrated sections was used to measure the concentration profiles of Na, K, Cl, Ca, S, and P in the mucosal tissue of rabbit ileum to elucidate how the secretion of Na^+ into the lateral intercellular spaces (LIS) generates a flow of water. There was a zone approximately 0.5 µm wide of peripheral cytoplasm immediately adjacent to the cell membrane and including the terminal web area where there was much less S, more P, and much less dry mass (14% of wet mass) than was found in the cell core (25% of wet mass). This zone constitutes 10-20% of cell volume, shows no significant ion gradient, but has a much higher average K concentration than in the cell core. It appears to constitute a compartment with an osmolality intermediate between the bathing medium and the LIS fluid; it may act as a channel in which ions are more mobile and are conducted by an actomyosin system. The cell core, with its high concentration of membraneous organelles, may form a relatively unstirred compartment with slower rates of diffusion. The average concentrations of Na and K in the LIS were significantly higher ($p<0.05$ and $p<0.025$, resp.) than the corresponding concentrations in the bathing solutions and in the capillary fluid. There appeared to be distinct gradients of Na, K, and Cl along the LIS and into the lamina propria, with a plateau about halfway along the channel. The concentration profile in the junctional half of the LIS showed a much steeper gradient within the wider region of the channel ($p<0.025$) than the one across the narrow junctional channel ($p<0.05$). The concentration profiles suggest a considerable osmotic flow of water across the junction into the LIS. The results establish the hypertonicity of the fluid in the LIS and the concentration gradients of Na, K, and Cl in the cells and in the LIS. It is concluded that, during the galactose-induced fluid absorption in rabbit ileum, the LIS form the primary sites of solute-water coupling.

6744 A NEW CORRELATION BETWEEN CALCIUM ABSORPTION AND INTESTINAL ALKALINE PHOSPHATASE ACTIVITY. (Fre.) Fournier, P.; Fontaine, N.; Fournier, A. (Faculte des sciences pharmaceutiques et biologiques, 92290, Chatenay-Malabry, France). *Ann. Nutr. Aliment.* 31(3):277-290; 1977.

A few male rats from an inbred Wistar strain were found to have a spontaneous highly increased ability to absorb calcium when compared to other rats from the same lot. Their calcium absorption coefficients varied from 24 to 47 compared to 13 to 22 for controls. The activity of various alkaline phosphatase preparations derived from ileal mucosa showed a corresponding increase. The activity of other enterocyte brush border enzymes, such as maltase, invertase, and leucylaminopeptidase, was comparable in both exceptional rats and controls. Similarly, there was no difference in alkaline phosphatase activity in other tissues (plasma, liver, kidney, and femur). The elevated calcium absorption and alkaline phosphatase activity were temporary, since exceptional rats had the same skeletal weight as normals. These findings support the probability that ileal alkaline phosphatases are a factor in calcium transfer in the rat.

6745 IS THE EFFECT OF DIPHENOLIC LAXATIVES MEDIATED VIA RELEASE OF PROSTAGLANDIN E? (Eng.) Beubler, E.; Juan, H. (Institut fur experimentelle und klinische Pharmakologie, Universitats-

platz 4, A-8010 Graz, Austria). *Experientia* 34(3): 386-387; 1978.

To investigate whether diphenolic laxatives exert their action via stimulation of prostaglandin (PG) biosynthesis, the diphenolic laxatives bisacodyl and phenolphthalein were compared with the osmotic laxative mannitol in female Sprague-Dawley rats. Net water flux was estimated in the *in vivo* isolated colon using the marker ^{14}C-polyethyleneglycol by measuring the change in its initial concentration over a 60-min period in response to either 4% mannitol, 1 or 10 µg/ml bisacodyl, or 100 µg/ml phenolphthalein. In separate nonisolated colon preparations, a 1-hr perfusion with Tyrode's solution (control period) was followed by a 1-hr perfusion with either 4% mannitol, 50 µg/ml bisacodyl, or 500 µg/ml phenolphthalein, and the PGE concentration in the perfusate was determined by radioimmunoassay. Control net water flux was directed from lumen to blood in the isolated colon; 1 µg/ml bisacodyl reduced this flux significantly ($p<0.05$), and 4% mannitol, 10 µg/ml bisacodyl, and 100 µg/ml phenolphthalein reversed net absorption to net secretion ($p<0.01$). Pretreatment of the rats with indomethacin (4 mg/kg/day, s.c., for 2 days), a PG synthesis inhibitor, did not affect water flux in controls or in mannitol-treated rats, but reduced the effect of 1 µg/ml and 10 µg/ml bisacodyl ($p<0.01$ and $p<0.05$, resp.) and of phenolphthalein ($p<0.01$). Net water flux was in the same direction but 1.74 times higher in the perfused colon than in the tied-off colon, necessitating larger drug doses. Bisacodyl and mannitol significantly reduced net water absorption ($p<0.01$), and phenolphthalein caused net water secretion ($p<0.01$). The amount of PGE released was 250 ± 97 pg/hr during the control period, which amount was significantly increased by bisacodyl (about threefold, $p<0.01$) and by phenolphthalein (about 4.5-fold, $p<0.01$) but was not affected by mannitol. The results suggest that diphenolic laxatives exert their action via stimulation of PGE biosynthesis in the colon.

6746 THE INFLUENCE OF STARVATION ON THE ZINC CONTENT OF PANETH CELLS OF THE RABBIT SMALL INTESTINE. (Eng.) Singh, I. (Medical Coll., Rohtak, India). *Anat. Anz.* 142(10):502-506; 1977.

Variations in the zinc content of the Paneth cells were examined in the rabbit small intestine during feeding and starvation. No zinc was found in the duodenum of the fed controls and of the animals starved for 24-72 hr. The zinc content increased in both controls and starved animals in the cranial-caudal direction, with the highest amounts found in the terminal ileum. The mean zinc content at each of six levels of small intestine was significantly lower in the starved animals than in the controls ($p<0.02$). These results suggest that zinc is involved more with the synthesis of the secretory granules of the Paneth cells, rather than in being a constituent thereof.

6747 SMALL INTESTINAL MORPHOLOGY AND CELL RENEWAL 72 HOURS AFTER BILE DUCT OPERATION IN RATS. (Eng.) Ecknauer, R.; Bohmer, R. (Dept. Clinical Chemistry, Univ. Ulm, Ulm, W. Germany). *Digestion* 16(1/2):165-168; 1977.

Small intestinal morphology and epithelial cell renewal were studied in bile duct-fistulated, bile duct-ligated rats, and two different sham-operated control groups, to investigate conflicting reports of the effect of these procedures on turnover of the intestinal epithelium. Sham-operated rats were either kept in restraining cages, as were all the rats with bile duct operation, or in ordinary cages. There was no difference in crypt depth and crypt-villus ratio between the four groups of rats. The rats with bile duct ligation had the shortest villi of the four groups (349 ± 43 and 238 ± 4 µm in jejunum and ileum, resp.). Villus base length showed the same tendency as villus height in the jejunum. Villus base length was shortest in the ileum of the bile duct-fistulated rats (288 ± 21 µm). In the jejunum, villus size of all four groups was smaller than villus size reported in nonstarved rats of the same age and strain, whereas in the ileum there was no significant difference. The number of vincristine-blocked metaphases (VBM) per crypt per 2 hr (representing cell renewal) was lowest in the rats with bile duct fistulation (8.4 ± 6.0 and 5.9 ± 6.0 VBM/2 hr/crypt in jejunum and ileum, resp.) and highest in the nonrestrained sham-operated rats (18.5 ± 3.1 and 20.4 ± 3.7 VBM/2 hr/crypt, resp.). The findings are compatible with the results of a previous investigation in which a reduction in ileal DNA synthesis and in cell shedding occurred following bile duct fistulization.

6748 POSTRESECTIONAL HYPERPLASIA OF THE SMALL INTESTINE WITHOUT BILE AND PANCREATIC JUICE. (Eng.) Shellito, P. C.; Dahl, E. P.; Terpstra, O. T.; Malt, R. A. (Shriners Burns Inst., Boston, MA 02114). *Proc. Soc. Exp. Biol. Med.* 158 (1):101-104; 1978.

To assess the role of pancreaticobiliary secretions in mediating adaptive hyperplasia of the small intestine, rats with ligation of the pancreaticobiliary duct were studied 48 hr after jejunectomy. After ligation, the rise in ileal RNA content was only 12% as compared with 44% control ($p<0.02$), and the rise in DNA content was only 13% as compared with 25% control ($p<0.01$). The results suggest that some adaptive hyperplasia can occur after pancreaticobiliary ligation, but the hyperplastic response is potentiated by pancreaticobiliary exocrine secretion.

6749 EFFECT OF EXOCRINE PANCREATIC INSUFFICIENCY ON SMALL INTESTINE IN THE MOUSE. (Eng.) Kwong, W. K. L.; Seetharam, B.; Alpers, D. H. (Washington Univ. Sch. Medicine, 660 S. Euclid, St. Louis, MO 63110). *Gastroenterology* 74(6):1277-1282; 1978.

A genetically conditioned mouse model of exocrine pancreatic insufficiency (epi) was used to study the effect of the absence of lumenal proteases on small intestinal mucosal proteins. The small bowel

was divided into eight equal segments. Enzyme activity was increased only in the first three segments in the case of maltase, sucrase, and lactase (all molecular weight >200,000). Alkaline phosphatase (molecular weight 145,000), trehalase (95,000), and peptidase (175,000) activities were unaffected in proximal segments from epi mice. Proximal brush border proteins were identified and measured quantitatively by sodium dodecyl sulfate acrylamide gel electrophoresis. Those enzymes with increased activity were associated with increased amounts of protein in epi mice. Double-label studies of protein turnover revealed a longer half-life for large brush border proteins (molecular weight >175,000) in epi mice than in normal mice. Enterokinase activity (a marker for duodenal mucosa) was nearly absent from the duodenum of epi mice. Receptors for the intrinsic factor-vitamin B_{12} complex (markers for ileal mucosa) were present in the ileum equally in normal and in epi mice. Enterokinase activity can be induced in epi mice by feeding its substrate trypsinogen, but not by trypsin or chymotrypsinogen. Epi mice thus retain the ability to synthesize enterokinase. Pancreatic proteases play an important role in the turnover of certain large mucosal proteins and in the induction of enterokinase.

6750 PROTEIN DIGESTION AND ABSORPTION IN RATS WITH PANCREATIC DUCT OCCLUSION. (Eng.) Curtis, K. J.; Gaines, H. D.; Kim, Y. S. (Veterans Admin. Hosp., 4150 Clement St., San Francisco, CA 94121). *Gastroenterology* 74(6):1271-1276; 1978.

To test the hypothesis that sufficient intraluminal digestion of dietary protein occurs to permit some absorption even in the absence of pancreatic proteolytic enzymes, the effects of pancreatic duct ligation on the digestion and absorption of a randomly ^{14}C-labeled protein meal were investigated in the rat. Although there was a significant reduction in luminal digestion and absorption of the protein meal at 3 and 4 hr in the pancreatic ductligated animals compared with controls ($p<0.02$ and $p<0.001$, resp.), 37% of administered protein was absorbed despite absence of luminal pancreatic proteolytic enzyme activity. To characterize further the digestive and absorptive processes that occur in the absence of luminal pancreatic proteolytic enzyme activity, whole protein meal (untreated) and protein preincubated with pepsin and HCl or HCl alone (treated) was instilled into isolated loops of rat intestine containing no demonstrable pancreatic proteolytic enzyme activity. Thirty percent absorption of the untreated protein meal occurred in 4 hr; significantly greater amounts of both treated forms of meal were absorbed ($p<0.005$ with both types of meal). It is concluded that the small bowel has the capacity to hydrolyze and absorb nutritionally significant amounts of dietary large molecular weight protein in the absence of luminal pancreatic enzyme activity. Furthermore, this process may be enhanced by prior denaturation and proteolysis in the stomach.

6751 EFFECTS OF HIGH PROTEIN DIET ON ADAPTATIONAL PROCESSES FOLLOWING SMALL INTESTINAL BY-PASS IN THE RAT. (Eng.) Macarone-Palmieri, R.; Mirkovitch, V.; Robinson, J. W. L.; Saegesser, F. (Centre Hospitalier Universitaire Vaudois, 1011 Lausanne, Switzerland). *Gastroenterol. Clin. Biol.* 2(3):279-286; 1978.

The effect of a high-protein diet on intestinal adaptation to an intestinal bypass was studied in male Wistar rats. In these animals, 70% of midintestine was excluded and drained through an end-to-side ileocecal anastomosis, while continuity was re-established between the jejunal and ileal remnants. During the 3 postoperative weeks, one group was fed with standard pellet food and the other with one of threefold greater protein content with the same daily caloric intake. The high-protein diet significantly reduced the postoperative weight gain ($F_{1,22}=4.55$). Both the jejunum and ileum in continuity in the animals on a high-protein diet retained the same rate of absorption of water, sodium, and glucose *in vivo* as that of control rats; their mucosae had normal sucrase content (1.0 ± 0.21, 0.4 ± 0.08, and 1.0 ± 0.20 IU/g in jejunum, ileum, and excluded loop, resp.), but lower phenylalanine uptake *in vitro* ($p<0.001$) and an increase in villus height in the jejunum ($p<0.005$) as compared to pellet-fed controls. The animals fed standard pellets manifested a greater jejunal water absorption, a higher mucosal sucrase content, but a less pronounced increase in villus height compared with the high-protein diet group. In the excluded intestines, which remained without intraluminal nutrition, there was no functional or morphological atrophy. The results suggest that the high-protein diet, as compared with the standard diet, was more effective in inducing an increase in the absorptive surface of the intestine in continuity during the adaptive process. Conversely, the high-protein diet resulted in an apparently greater reduction in intestinal absorption *in vivo*.

6752 EXPERIMENTAL STUDIES ON FLUID PATHOPHYSIOLOGY IN SMALL INTESTINAL OBSTRUCTION IN THE RAT: IV. EFFECTS OF INTRALUMINAL HYPEROSMOLALITY AND SIMULTANEOUS INTRAVENOUS INFUSIONS ON MUCOSAL MICROMORPHOLOGY. (Eng.) Johnson, L.; Lundquist, P. G.; Nordstrom, H.; Nylander, G. (Karolinska Hosp., 104 01 Stockholm 60, Sweden). *Scand. J. Gastroenterol.* 13(3):373-384; 1978.

6753 FLAVIN PHOSPHATASE ACTIVITY OF INTESTINAL BRUSH BORDER: FUNCTION IN INTESTINAL ABSORPTION OF DIETARY RIBOFLAVIN [Abstract]. (Eng.) Akiyama, T.; Selhub, J.; Rosenberg, I. H. (Dept. Medicine, Univ. Chicago, Chicago, IL). *Am. J. Clin. Nutr.* 31(4):695; 1978.

6754 STIMULATION OF HUMAN COLONIC ADENYLATE CYCLASE [Letter to Editor]. (Eng.) Simon, B.; Kather, H. (Universitats-Klinik, Bergheimerstrasse 58, 69 Heidelberg, W. Germany). *Am. J. Dig. Dis.* 23(1):93-94; 1978.

6755 PATHOPHYSIOLOGICAL ASPECTS OF COXSACKIE-VIRUS B INTESTINAL INFECTION. (Eng.) Loria, R. M.; Kibrick, S.; Broitman, S. A. (Boston Univ. Sch. Medicine, Boston, MA 02118). *Am. J. Clin. Nutr.* 30(11):1876-1879; 1977.

6756 RE-EXAMINATION OF SMALL INTESTINAL DISPOSAL OF Vibrio cholerae IN MICE. (Eng.) Bloom, L.; Rowley, D. (Dept. Microbiology and Immunology, Univ. Adelaide, Adelaide, South Australia 5000, Australia). *Aust. J. Exp. Biol. Med. Sci.* 55(Part 4):385-391; 1977.

6757 DEVICE FOR OBTAINING MULTIPLE SIMULTANEOUS SAMPLES OF INTESTINAL CONTENTS DURING PERFUSION STUDIES IN MAN. (Eng.) Matseshe, J. W.; Malagelada, J. R.; Phillips, S. F. (Mayo Clinic and Medical Sch., Rochester, MN 55901). *Gut* 18(11):919-920; 1977.

6758 SPECIFIC BINDING OF ^{3}H-MEPYRAMINE TO HISTAMINE H_1 RECEPTORS IN INTESTINAL SMOOTH MUSCLE. (Eng.) Hill, S. J.; Young, J. M.; Marrian, D. H. (Dept. Pharmacology, Univ. Cambridge, Hills Rd., Cambridge, England). *Nature* 270(5635): 361-363; 1977.

See also, 6571, 6577, 6584, 6605, 6606, 6607, 6617, 6627, 6649, 6672, 6684, 6733, 6760, 6764, 6786, 7023, 7092.

GENERAL

6759 THE DISTRIBUTION OF BLOOD FLOW ALONG THE SMALL INTESTINE OF THE DOG. (Eng.) Eade, M. N.; Ginn, R. W. (Sch. Medicine, Auckland Univ., Auckland, New Zealand). *Proc. Soc. Exp. Biol. Med.* 157(3):390-392; 1978.

To investigate whether a blood flow gradient exists along the small intestine of the dog, intestinal blood flow was measured by the indicator-fractionation technique with ^{42}K (15 μCi/kg) as the indicator in 18 anesthetized mongrel dogs. A two-way analysis of variance demonstrated a significant difference of blood flow in the duodenal, jejunal, and distal ileal sites ($p<0.01$), and Scheffe multiple comparison tests showed that the mean blood flow in the distal ileum was significantly lower than in the duodenum ($p<0.05$) or in the jejunum ($p<0.05$). There was no significant difference in blood flow between the duodenum and jejunum. In eight studies in which jejuno-ileal blood flow was measured, it was significantly higher than the flow in the distal ileum ($p<0.01$) and somewhat lower than the flow in the duodenum or jejunum. The mean intestinal blood flow to all sites was significantly higher ($p<0.05$) in animals with cardiac output >10 ml/min/100 g (i.e., in the 7 dogs without laparotomy). The results indicate that, when intestinal blood flow is measured under basal conditions in the dog, there is a definite gradient of blood flow down the intestine.

6760 MICROLYMPHANGIOGRAPHIC STUDY OF LYMPHATIC REGENERATION FOLLOWING INTESTINAL ANASTOMOSIS. (Eng.) Satomura, K.; Tanigawa, N.; Magari, S. (Sch. Medicine, Kyoto Univ., Kyoto, Japan). *Surg. Gynecol. Obstet.* 146(3):415-418; 1978.

Lymphatic regeneration of the canine intestinal lymphatic system was studied following a single-layer inverting ileal anastomosis using a microlymphangiographic technique in which differentiation between lymphatic and blood vessels was assured by washing out the intravascular dye with a saline perfusion solution. Specimens were prepared for light microscopic examination. The central lymphatics in the mucosa of the ileum were readily identified at the center of villi, there was a horizontal lymphatic network at the bottom of the villi, and some branches of it entered the muscularis mucosa, forming a second horizontal network that spread to the bottom of the intestinal glands. Branches of this plexus entered into the submucosa, where the lymphatic vessels were characterized by their large diameters and were associated in a loose plexus with paired arteries and veins, the three vessels running along together. These lymphatics entered the subserosa and received additional branches from a dense tangential plexus located between the circular and longitudinal muscle layers. On the fourth postoperative day, the lymphatics were still interrupted close to the anastomotic line. On the seventh postoperative day, cross circulation of the lymphatics was recognized, and the transverse lymphatics were dilated and apparent; these findings persisted on days 10 and 14. On the 21st day, the normal lymphatic vessel pattern was restored: fine, relatively straight vessels appeared across the anastomotic line.

6761 THE SIGNIFICANCE OF ELEVATED PERITONEAL FLUID PHOSPHATE LEVEL IN INTESTINAL INFARCTION. (Eng.) Sawer, B. A.; Jamieson, W. G.; Durand, D. (Victoria Hosp., London, Ontario, Canada). *Surg. Gynecol. Obstet.* 146(1):43-45; 1978.

A previously described model of intestinal infarction was used to duplicate the original experiment, which demonstrated a significant rise in the serum inorganic phosphate level, and to study the composition of peritoneal fluid. The superior mesenteric artery was doubly ligated at its origin in 10 dogs, and the superior mesenteric vein was tied as it joins the portal vein in another 10. Controls underwent laparotomy with dissection of the superior mesenteric artery or vein. There was a significant increase in the inorganic phosphate level in the peritoneal fluid in all experimental dogs ($p<0.05$), by 2 hr postligation in the superior mesenteric vein-ligated group and by 4 hr in the superior mesenteric artery-ligated group. At 2 hr, the mean levels in the artery- and vein-ligated groups were 6.0 ± 0.56 mg% and 8.1 ± 0.71 mg%, resp. ($p<0.05$). This difference was also seen at 4 hr. Significantly higher ($p<0.05$) serum levels of inorganic phosphate and base deficit were also seen in the experimental groups. These results confirm those of the previous study and show that the inorganic phosphate level in the peritoneal fluid is elevated in addition to that in the serum. The authors suggest that, in the patient with possible intestinal infarction, an elevated serum phosphate level, elevated peritoneal fluid phosphate level, greater base deficit, and leukocytosis may be useful in making an earlier diagnosis of this disease, thereby reducing its morbidity and mortality.

6762 COMPARISON OF RADIO-OPAQUE PELLETS AND CHROMIUM SESQUIOXIDE AS INERT MARKERS IN STUDIES REQUIRING ACCURATE FAECAL COLLECTIONS. (Eng.) Branch, W. J.; Cummings, J. H. (MRC Dunn Nutrition Unit, Cambridge, England). *Gut* 19(5):371-376; 1978.

Radiopaque pellets (ROP) similar to those currently used to measure gastrointestinal transit time were compared with chromium sesquioxide to assess their suitability for use as inert markers in the gut. Five healthy subjects took both markers with every meal for two separate 3-week periods while taking metabolically controlled diets. Overall recovery of both markers was satisfactory; ROP was 99.7 ± 0.3% recovered and chromium, 97.8 ± 1.6%. A comparison of the amount of each marker recovered in 69 separate fecal collection periods of various lengths showed close agreement ($r=0.99$), and the tail-off in marker excretion after cessation of ROP and chromium intake was similar, although slightly more prolonged for chromium. The amount of marker retained in the gut was 13.5% greater for chromium at the end of the 3-week study periods. Both markers proved to be satisfactory for correcting variations in fecal calcium output. The ROP, however, offer clear advantages over chromium in that they are considerably easier and quicker to measure, the method of measurement using x-rays does not alter the stools, and fecal handling is minimized. The precision of ROP measurement is greater and, because of the variety of ROP available, they offer more flexibility for metabolic studies. In addition, stool by stool analysis is possible, enabling simultaneous measurement of mean transit time to be made in experimental subjects.

6763 THE DISINTEGRATION OF SURGICAL SUTURES ON EXPOSURE TO PANCREATIC JUICE. (Eng.) Mizuma, K.; Lee, P. C.; Howard, J. M. (Medical Coll. Ohio at Toledo, P.O. Box 6190, Toledo, OH 43614). *Ann. Surg.* 186(6):718-722; 1977.

6764 DIFFERENTIATION OF INTRAMURAL GANGLIA IN THE DISSOCIATED RECTOSIGMOID OF THE RAT: AN ORGAN CULTURE STUDY. (Eng.) Ito, Y.; Donahoe, P. K.; Hendren, W. H. (Massachusetts General Hosp., 32 Fruit St., Boston, MA 02114). *J. Pediatr. Surg.* 12(6):969-975; 1977.

6765 EFFECT OF ANTACIDS ON ASPIRIN DISSOLUTION AND BIOAVAILABILITY. (Eng.) Nayak, R. K.; Smyth, R. D.; Polk, A.; Herczeg, T.; Carter, V.; Visalli, A. J.; Reavey-Cantwell, N. H. (McNeil Lab., Inc., Camp Hill Rd., Fort Washington, PA 19034). *J. Pharmacokinet. Biopharm.* 5(6):597-613; 1977.

6766 CYANOACRYLATE SEALING OF PANCREATIC BIOPSY SITES IN DOGS. (Eng.) Harmon, H. C.; Doan, T. B.; Pate, J. W. (Univ. Tennessee Center Health Sciences, Memphis, TN 38103). *Am. Surg.* 43(12):807-810; 1977.

6767 PURIFICATION AND PARTIAL CHARACTERIZATION OF THE GASTRIC ULCER INHIBITORY SUBSTANCE FROM CULTURE FILTRATE OF Bacillus subtilis H. (Eng.) Mimura, T.; Muto, N.; Tsujibo, H.; Onishi, N.; Aonuma, S. (Faculty Pharmaceutical Sciences, Osaka Univ., 133-1, Yamadakami, Suita-shi, Osaka, Japan). *Chem. Pharm. Bull.* 25(10):2770-2774; 1977.

6768 THE PHARMACOLOGY OF SC-27166: A NOVEL ANTIDIARRHEAL AGENT. (Eng.) Dajani, E. Z.; Bianchi, R. G.; East, P. F.; Bloss, J. L.; Adelstein, G. W.; Yen, C. H. (Searle Lab., P.O. Box 5110, Chicago, IL 60680). *J. Pharmacol. Exp. Ther.* 203(3):512-526; 1977.

6769 ANTIDIARRHEAL AND CENTRAL NERVOUS SYSTEM ACTIVITIES OF SC-27166 (2-[3-(5-METHYL-1,-3,4-OXADIAZOL-2-YL)-3,3-DIPHENYLPROPYL]-2-AZA-

BICYCLO[2.2.2]OCTANE), A NEW ANTIDIARRHEAL AGENT, RESULTING FROM BINDING TO OPIATE RECEPTOR SITES OF BRAIN AND MYENTERIC PLEXUS. (Eng.) Mackerer, C. R.; Brougham, L. R.; East, P. F.; Bloss, J. L.; Dajani, E. Z.; Clay, G. A. (Searle Lab., P.O. Box 5110, Chicago, IL 60680). *J. Pharmacol. Exp. Ther.* 203(3):527-538; 1977.

See also, 6647, 6651, 6660, 6670, 6712, 6725, 7108, 7211.

DIAGNOSTIC PROCEDURES

6770 ULTRASONIC FINDINGS IN INTRAMURAL EXOGASTRIC LESIONS. (Eng.) Sandler, M. A.; Ratanaprakarn, S.; Madrazo, B. L. (Henry Ford Hosp., 2799 West Grand Blvd., Detroit, MI 48202). *Radiology* 128(1):189-192; 1978.

The cases of four patients with intramural exogastric masses in whom ultrasonic findings suggested a gastric origin are presented. In all cases, a large mass was identified in the left mid- and upper abdomen with a strip of solid tissue extending toward the left hemidiaphragm anteriorly, adjacent to the left lobe of the liver. This finding, best demonstrated on longitudinal scanning, suggested that the mass originated in the stomach, rather than in the spleen or splenic flexure of the colon, which are posterior in location. Two lesions were leiomyoblastomas and two leiomyosarcomas. A benign leiomyoblastoma in one patient contained a small number of echoes of low intensity, while a malignant leiomyoblastoma contained a very large number of high-intensity echoes. This difference could have been due to the necrosis in the malignant lesion providing numerous interfaces between tissues with substantially different acoustic impedance properties, in contrast with the cellular uniformity of the benign lesion. The ultrasound examination in both patients with leiomyosarcoma demonstrated a solid mass with many high-amplitude echoes similar in appearance to the malignant leiomyoblastoma. In the patient with the malignant leiomyoblastoma, the gastric origin of the mass was not considered until the ultrasound examination was carried out. This examination may suggest that a lesion is of gastric origin, and the patient's evaluation may be expedited.

6771 BARIUM ENEMA: AN OUTPATIENT PROCEDURE IN THE EARLY DIAGNOSIS OF ACUTE APPENDICITIS. (Eng.) Lewin, G. A.; Mikity, V.; Wingert, W. A. (Univ. Southern California Sch. Medicine, 1129 North State St., Rm. 1D36A, Los Angeles, CA 90033). *J. Pediatr.* 92(3):451-453; 1978.

The diagnostic value of barium enema as an outpatient procedure was evaluated in 50 children (ages 1-18 yr) to improve the early detection of appendicitis and to reduce both unnecessary resection and morbidity due to perforation. The procedure was performed on an emergency basis without bowel preparation when routine history, physical findings, laboratory data, and roentgenograms were equivocal. Fluoroscopic control and gravity technique not exceeding a height of 90 cm were used; spot films and pre- and postevacuation films were taken, and a specific effort was made to fill the appendix by changing the patient's position. The criteria of Soter and Schey were used for diagnosis. Of 49 successful barium enemas, 36 were normal, 12 were positive, and there was 1 nonfilling appendix. Follow-up was done on 30 normal patients and the 1 with nonfilling appendix, and no sequelae were observed; 6 girls with normal findings were treated for pelvic inflammatory disease (5) or ovarian cyst (1). The positive studies expedited definitive therapy, and were 100% selective for disease requiring surgery; no morbidity from unnecessary surgery occurred. The procedure is recommended particularly in preschool-age children, the obese, the teenage girl with right lower quadrant pain, and in children with chronic diseases in whom an early correct diagnosis is extremely important.

6772 NEW TECHNIQUE OF EXOCRINE PANCREATIC FUNCTION TESTING WITH THE USE OF 4-(N-ACETYL-L-TYROSYL)AMINOBENZOIC ACID. (Cze.) Malis, F.; Fric, P.; Kasafirek, E.; Slaby, J. (II. vedecke oddeleni gastroenterologicke fakulty vseobecneho lekarstvi, Universita Karlova, Karlovo nam. 32, 121 11 Praha 2, Czechoslovakia). *Cas. Lek. Cesk.* 116 (48):1489-1493; 1977.

A 2-g oral dose of 4-(acetyl-L-tyrosyl)aminobenzoic acid was used to assay pancreatic chymotrypsin secretion following stimulation by Lundh's test meal in 45 subjects, including normal controls. Under the action of chymotrypsin, 4-aminobenzoic acid is released in the intestine, and its urinary excretion indicates the degree of exocrine pancreatic secretion. The urinary 4-aminobenzoic acid level is determined by the diazo reaction following acid hydrolysis. The average 4-aminobenzoic acid level found in 8-hr urine samples of healthy controls was 69.4 ± 3% with the lower standard limit of 49.6%. The average 4-aminobenzoic acid level was markedly lower in patients with pancreatic insufficiency (25.1 ± 3.6%). Reduction of the urine collection period to 6 hr was permissible for patients with advanced pancreatic insufficiency. Patients with sprue require an 8-hr urine collection period. The new test is also suitable for outpatient screening.

6773 RADIOIMMUNOASSAY OF LACTOFERRIN IN PANCREATIC JUICE AS A TEST FOR PANCREATIC DISEASES. (Eng.) Fedail, S. S.; Harvey, R. F.; Salmon, P. R.; Read, A. E. (Bristol Royal Infirmary, Bristol, England). *Lancet* 1(8067):181-182; 1978.

A radioimmunoassay for lactoferrin (LF) was developed to assess the possibility that the measurement of LF in pancreatic juice obtained endoscopically might be helpful in the diagnosis of pancreatic diseases. Pancreatic juice was obtained from 19 patients with chronic pancreatitis and 10 with cancer of the pancreas and from 11 controls. Median LF concentrations were 2,310 ng/ml (range 870-11,400) in patients with chronic pancreatitis compared with 128 ng/ml (range 30-390) in controls and 105 ng/ml (range 10-387) in patients with pancreatic cancer. In one patient with both cancer and pre-existing pancreatitis (for 16 yr), the LF concentration was high (1,300 ng/ml). The results suggest that measurement of lactoferrin in pure pancreatic juice may be useful in the diagnosis of pancreatic disease, especially in the differential diagnosis between cancer and pancreatitis.

6774 ANGIOGRAPHY OF THE PANCREAS. (Eng.) Ekelund, L.; Gerlock, J. (Vanderbilt Univ. Hosp., Nashville, TN 37232). *South. Med. J.* 71(2):173-176; 1978.

The diagnostic potentials of pancreatic angiography are discussed on the basis of four illustrative cases and a review of the literature. The approach must be adjusted to each individual patient, and the examination must proceed until malignancy is confirmed or eliminated. Both the celiac and superior mesenteric arteries must be examined, superselective catheterization of the gastroduodenal or dorsal pancreatic artery should always be attempted, and pharmacoangiography is sometimes helpful in enhancing visualization of the small pancreatic vessels. A normal pancreaticogram in a 40-yr-old man is presented. Pancreaticography revealed discrete, serpiginous encasement of small arteries in the head of the pancreas in a 56-yr-old man; percutaneous transhepatic cholangiography demonstrated obstruction of the common bile duct at this level, and at operation a resectable 2 x 2 cm carcinoma was found. In a 60-yr-old man, angiography indicated a mass in the body and tail of the pancreas, occlusion of the splenic vein with collateral formation, and obstruction at the junction of the superior mesenteric and portal veins. The diagnosis of large, nonresectable carcinoma was confirmed at operation. In a 30-yr-old woman, angiography failed to reveal tumor vessels, and all veins were seen to be normal. A possible expansile lesion in the head of the pancreas was suggested and at operation, a small inflammatory mass was found. Irregular encasement of arteries is the most reliable angiographic finding in the diagnosis of pancreatic carcinoma, the incidence of tumor vessels in these lesions is a debated subject, and the demonstration of venous lesions is very important in the diagnosis.

6775 THE EFFECT OF GASTROGRAFIN AND GLUCAGON ON CT SCANNING OF THE PANCREAS: A BLIND CLINICAL TRIAL. (Eng.) Moss, A. A.; Kressel, H. Y.; Korobkin, M.; Goldberg, H. I.; Rohlfing, B. M.; Brasch, R. C. (Univ. California Sch. Medicine, San Francisco, CA). *Radiology* 126(3):711-714; 1978.

To overcome certain problems that reduce the information content of computed tomographic (CT) scans of the abdomen, a blind clinical trial of the effects of Gastrografin and glucagon on pancreatic CT scanning was carried out in 25 patients who had not had gastric surgery. Following an initial scan, the patients were given dilute Gastrografin (10 ml/230 ml water) to drink and placed on their right sides for 5 min. After being repositioned for scanning in the supine position, glucagon (1 mg over 1 min, i.v.) was given to each patient. The pancreatic region was then rescanned. The series of scans were randomly coded and rated by four radiologists skilled in CT interpretation. Rating for overall pancreatic visualization, visualization of the pancreatic head, body, and tail, and the presence of gas artifacts was performed on a scale of 0 to 4, and the data were statistically analyzed. A significant improvement in visualization of all parts of the pancreas and a reduction in gas artifacts were found following Gastrografin and glucagon administration ($p<0.005$–0.02 for the pooled ratings of the 4 raters). There was a high level of correlation ($r=0.56$–0.76) among the independent ratings performed. Gastrografin-glucagon administration is recommended prior to pancreatic CT scanning if the scanning cycle is 18 sec or longer.

6776 ENDOSCOPY-RELATED BACTEREMIA. (Eng.) Stray, N.; Midtvedt, T.; Valnes, K.; Rosseland, A.; Pytte, R.; Hovik, B. (Central Hosp. Akershus, Oslo, Norway). *Scand. J. Gastroenterol.* 13(3):345-347; 1978.

To determine the risk of bacteremia in patients undergoing endoscopic retrograde cholangiopancreatography (ERCP), a prospective study of 100 patients undergoing gastroscopy, 25 undergoing colonoscopy, and 25 undergoing ERCP was undertaken. The patients were unselected except that none had received antibiotics for 4 days before the procedure, none was febrile, and none had i.v. or urinary bladder catheters. Blood sampling was performed from an antebrachial vein. Bacteremia was detected in 1/100, 1/25, and 0/25 patients subjected to gastroscopy, coloscopy, and ERCP, resp. In 4/600 blood cultures performed, the bacilli recovered appeared to be due to contamination. The results suggest that bacteremia is very rare after endoscopy of the gastrointestinal tract. Therefore, routine prophylactic antimicrobials are not advocated for patients undergoing endoscopic procedures.

6777 USE OF ERCP IN THE DIAGNOSIS OF INTERNAL PANCREATIC FISTULA. (Eng.) Sottomayor, M.; Nom Chong, R.; Dawson, M. (Baragwanath Hosp., P.O. Bertsham, Johannesburg, South Africa). *Gut* 19(3):244-246; 1978.

Two cases of pancreatic ascites in which internal pancreatic fistulae were demonstrated preoperatively using endoscopic retrograde pancreatography (ERCP) are described. The patients, a 31-yr-old man and a 42-yr-old woman, presented with abdominal distention and weight loss. Both had a history of heavy alcohol consumption. Despite paracentesis, ascites accumulated rapidly. ERCP showed features of chronic pancreatitis in both patients and a leak of contrast media from the pancreatic tail into the ascitic fluid in the first patient and from a ruptured pseudocyst into the lesser sac in the second. ERCP is an effective diagnostic tecnnique and may be useful in planning the best method of treatment.

6778 COMPUTED TOMOGRAPHIC SCANNING IN LIVER DISEASE. (Eng.) Fawcitt, R. A.; Forbes, W. C.; Isherwood, I.; Morris, A. I.; Marsh, M. N.; Turnberg, L. A. (Dept. Diagnostic Radiology, Univ.

Manchester, M13 9PT, England). *Clin. Radiol.* 29(3): 251-254; 1978.

The value of computed tomography (CT) in the diagnosis of liver diseases was assessed in 100 patients with liver diseases (23 with jaundice, 40 with cirrhosis, 7 with fatty infiltration, 10 with malignancy, 15 with acute and chronic active hepatitis, and 17 with miscellaneous liver diseases). Of the 23 jaundiced patients, 14 had extrahepatic biliary obstruction, in 13 of which a dilated duct system was demonstrated. The cause of the obstruction was demonstrated by CT in 11 cases. In the nine cases of intrahepatic jaundice, a normal duct system was reported in eight. Reduced liver volume was observed by CT in 14 of 33 cases of nonhemochromatotic cirrhosis and in 4 of 7 cases of cirrhosis with hemochromatosis. CT was diagnostic of fatty infiltration in five of the seven cases. Hepatic metastases were correctly interpreted in six of eight patients, where they were seen as localized areas of diminished density. Eleven patients with chronic active hepatitis were examined, and in the six without marked cirrhotic change, nonspecific abnormalities such as hepatomegaly or hepatosplenomegaly were found. Two of four patients with acute hepatitis had normal scans, and the other two showed hepatic or splenic enlargement. The results show that CT is valuable in the diagnosis of hepatic and biliary tract diseases. Further refinement of hepatic density analysis promises to increase the diagnostic value of CT in cirrhosis.

6779 DIAGNOSTIC ACCURACY OF CT IN CIRCUMSCRIPT LIVER DISEASE. (Eng.) Scherer, U.; Rothe, R.; Eisenberg, J.; Schildberg, F. W.; Meister, P.; Lissner, J. (Universitat Munchen Klinikum Grosshadern, Marchioninistrasse 15, 8000 Munchen 70, W. Germany). *Am. J. Roentgenol.* 130(4):711-714; 1978.

To evaluate the accuracy of computed tomography (CT) in diagnosing circumscript liver disease, CT findings in 105 patients, usually referred for presumed liver disease but sometimes for suspected pancreatic disease, suspected retroperitoneal lymphomas, or known circumscript liver disease, were compared with the results of invasive diagnostic procedures (51 laparoscopies, 46 laparotomies, and 20 autopsies with at least one procedure performed in each patient). The mean and maximum intervals between the CT scans and invasive procedures were 12.5 and 73 days, resp. All scans were read twice: at the time of the study and retrospectively without knowledge of the results of the invasive procedures, and the data are based on the retrospective evaluation. The invasive methods demonstrated circumscript liver disease in 45/105 patients. In cases of adenoma (1), simple cysts (2), polycystic disease (3), abscesses (2), and echinococciasis (1), the CT diagnosis was correct. In the one case of eosinophilic infiltrations and the one of cholangioma, CT disclosed multiple small areas of decreased density, but a type-specific diagnosis could not be made. In 28/31 cases of metastatic liver disease, the CT diagnosis was correct; 3 cases were misinterpreted as normal. Two of three cases of carcinoma were accurately diagnosed by CT, and one was misinterpreted as hepatosplenomegaly. One case of hemangioma was misinterpreted as normal. There were 6 false-positive diagnoses among the 60 patients without circumscript liver disease: 4 diagnoses of suspicion of metastatic liver disease, 1 misinterpretation of a basal pleural effusion as a large intrahepatic cyst, and 1 diagnosis of a small intrahepatic cyst that did not reach the surface of the liver (although classified as a false-positive, it might be accurate, as laparoscopy only, and not biopsy, was performed). CT is valuable in detecting and differentiating circumscript liver disease. The diagnostic accuracy of CT in diffuse liver disease remains to be established.

6780 DETECTION OF HEPATITIS-B SURFACE ANTIGEN IN BLOOD AND BLOOD PRODUCTS DRIED ON FILTER PAPER. (Eng.) Farzadegan, H.; Noori, K. H.; Ala, F. (Iranian Natl. Blood Transfusion Service, 138 Villa Ave., Teheran, Iran). *Lancet* 1(8060): 362-363; 1978.

A method for the detection of hepatitis B surface antigen (HBsAg) in blood and blood products dried on filter paper was developed. One drop (>0.025 ml) of capillary whole blood was collected on Whatman 4 filter discs from 10 healthy carriers of HBsAg, and blood obtained by venepuncture from the subjects was processed to obtain packed RBC, plasma, WBC, and platelets. A drop of each of these products and a known HBsAg-positive plasma Cohn fraction-II sample were also put on filter discs. Replicate samples were stored in polyethylene tubes for 1, 3, 7, 14, or 30 days at 4 C or 37 C to simulate various conditions of field study. Then 1, 5, or 10 ml of 0.85% saline solution was added to each tube for 30 min, and the solution was analyzed for HBsAg by immunoelectro-osmophoresis (IEOP), hemagglutination inhibition (HAI), reverse passive hemagglutination (RPHA), and radioimmunoassay (RIA). RIA detected HBsAg in every sample. RPHA was positive in all 1-day samples, in 11/14 7-day samples, and in 7/14 30-day samples. HAI and IEOP were less sensitive, in that order. Dilutions with 1 ml of saline gave the most strongly positive results; 4 C was the best storage temperature. The results suggest that the filter paper technique would have logistic and economic advantages in hepatitis B surveillance programs and would not be associated with a loss of sensitivity or specificity when analyzed by RIA or RPHA.

6781 DOSE RESPONSE TO INTRAMUSCULAR GLUCAGON DURING HYPOTONIC RADIOGRAPHY. (Eng.) Miller, R. E.; Chernish, S. M.; Brunelle, R. L.; Rosenak, B. D. (Indiana Univ. Sch. Medicine, Indianapolis, IN 46202). *Radiology* 127(1):49-53; 1978.

6782 IOGLYCAMIDE (BILIGRAM) STUDIES IN MAN. RADIOLOGICAL OPACIFICATION OF THE BILE

DUCT. A COMPARISON OF A NUMBER OF DIFFERENT METHODS. (Eng.) Bell, G. D.; Frank, J.; Fayadh, M.; Smith, P. L. C.; Fry, I. K. (City Hosp., Hucknall Rd., Nottingham, England). *Br. J. Radiol.* 51(603):191-195; 1978.

6783 THE STATE OF RADIOGRAPHIC TECHNIQUE IN THE EXAMINATION OF THE COLON: A SURVEY. (Eng.) Thoeni, R. F.; Margulis, A. R. (Univ. California Sch. Medicine, San Francisco, CA 94143). *Radiology* 127(2):317-323; 1978.

6784 LOCALIZATION OF THE HEAD OF THE PANCREAS USING THE JUNCTION OF THE LEFT RENAL VEIN AND THE INFERIOR VENA CAVA. (Eng.) Kuhns, L. R.; Borlaza, G. S.; Seigel, R.; Cho, K. J. (Univ. Michigan Medical Center, Ann Arbor, MI). *J. Comput. Assisted Tomogr.* 2(2):170-172; 1978.

6785 FUNDAMENTAL AND CLINICAL STUDIES ON AMYLASE ISOZYMES. (Eng.) Takeuchi, T.; Kameya, T.; Sugimura, T. *In: Pathophysiology of Carcinogenesis in Digestive Organs. Proceedings of the 7th International Symposium of The Princess Takamatsu Cancer Research Fund, Tokyo, 1976.* (Tokyo: University of Tokyo Press): pp. 351-362; 1977.

6786 EFFECTS OF ORALLY FED CHOLERA TOXIN IN ADULT RATS. (Eng.) Akhter, M. H.; Sabir, M.; Bhide, N. K. (All India Inst. Medical Sciences, New Delhi 110016, India). *Indian J. Exp. Biol.* 15(10):891-894; 1977.

6787 A "NEW" DIAPHRAGM FOLLOWING PROSTHETIC REPAIR OF EXPERIMENTAL HEMIDIAPHRAGMATIC DEFECTS IN THE PUP. (Eng.) Touloukian, R. J. (Yale Univ. Sch. Medicine, New Haven, CT). *Ann. Surg.* 187(1):47-51; 1978.

6788 ESTIMATION OF THE SODIUM CONTENT AND NEUTALISING CAPACITY OF SOME COMMONLY USED ANTACIDS [Abstract]. (Eng.) Barry, R. E.; Ford, J. (Dept. Medicine, Univ. Bristol, Bristol, England). *Gut* 18(11):A969; 1977.

6789 EFFECT OF ACID AND PEPSIN ON BLOOD COAGULATION AND PLATELET AGGREGATION: A POSSIBLE CONTRIBUTOR TO PROLONGED GASTRODUODENAL MUCOSAL HEMORRHAGE. (Eng.) Green, F. W., Jr.; Kaplan, M. M.; Curtis, L. E.; Levine, P. H. (Memorial Hosp., 119 Belmont St., Worcester, MA 01605). *Gastroenterology* 74(1):38-43; 1978.

6790 UPPER GASTROINTESTINAL FIBERENDOSCOPY IN CHILDREN. (Por.) de Oliveira Lemos, A. T.; Polonovski, J. C.; Mougenot, J. F. (Av. Almirante Alexandrino, 720, ap. 203, 3000 Belo Horizonte, MG., Brasil). *Arq. Gastroenterol.* 14(4):236-240; 1977.

6791 RESULTS OF THERAPY OF GASTRO-INTESTINAL HEMORRHAGE BEFORE AND AFTER INTRODUCTION OF EMERGENCY ENDOSCOPY AT THE BONN UNIV. SURGICAL CLINIC [Abstract]. (Eng.) Oberhammer, E.; Paquet, K. J. (Surgical Clinic, Univ. Bonn, Bonn, W. Germany). *Endoscopy* 9(3):189-190; 1977.

6792 REPORT ON PRELIMINARY EXPERIMENTAL AND CLINICAL EXPERIENCES WITH A NEW TYPE OF ENDOSCOPIC ARGON LASER PHOTOCOAGULATOR [Abstract]. (Eng.) Fruhmorgen, P.; Reidenbach, H. D.; Bodem, F.; Kaduk, B.; Demling, L. (Medical Dept., Univ. Erlangen-Nurnberg, D-8520 Erlangen, W. Germany). *Endoscopy* 9(3):191; 1977.

6793 PROXIMAL INTESTINOSCOPY: PREMEDICATION WITH DIMENHYDRINATE AND PETHIDINE--A DOUBLE-BLIND STUDY [Abstract]. (Eng.) Pohle, W.; Hofmann, E.; May, B.; Muller, H. O.; Salamon, V. (Med. Klinik und Poliklinik "Bergmannsheil," Hunscheidtstr. 1, 4630 Bochum 1, W. Germany). *Endoscopy* 9(3):191; 1977.

6794 IMPROVED RADIONUCLIDE IMAGING OF THE PANCREAS [Letter to Editor]. (Eng.) Nathan, M. H.; Domanski, K. (Scottsdale Memorial Hosp., Scottsdale, AZ). *JAMA* 239(9):831-833; 1978.

6795 THIOCYANATE AS A MARKER OF SALIVA IN GASTRIC JUICE [Abstract]? (Eng.) Boulos, P. B.; Dave, M.; Whitfield, P. F.; Hobsley, M. (Middlesex Hosp., London, England). *Br. J. Gastroenterol.* 18(11):A946-A947; 1977.

6796 BREATH TESTS IN GASTROENTEROLOGY. (Eng.) Hepner, G. W. (Univ. California Sch. Medicine, Torrance, CA). *Adv. Intern. Med.* 23:25-45; 1978.

6797 FULLY AUTOMATIC COMPUTER-ASSISTED PANCREAS IMAGING. (Eng.) Zurowski, S.; Graban, W. T.; Jakubowski, W. (Medical Acad. Warsaw, Banacha 1A, Warsaw, Poland). *Eur. J. Nucl. Med.* 2(4):273-275; 1977.

6798 HOW OFTEN DOES BACTERAEMIA OCCUR FOLLOWING ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY (ERCP)? (Eng.) Lam, S. K.; Tsui, J. K. C.; Chan, P. K. W.; Wong, K. P.; Ong, G. B. (Dept. Medicine, Univ. Hong Kong, Hong Kong). *Endoscopy* 9(4):231-234; 1977.

6799 VISUALIZATION OF THE AREAE GASTRICAE IN A DOUBLE CONTRAST EXAMINATION--DEPENDENCE ON THE CONTRAST MEDIUM. (Eng.) Kormano, M.; Makela, P.; Rossi, I. (Central Hosp., 20520 Turku 52, Finland). *Fortschr. Roentgenstr.* 128(1):52-56; 1978.

6800 DETERGENT ALTERED ALKALINE PHOSPHATASE PATTERNS OF LIVER DISEASE. (Eng.) Epstein, E.; Baginski, E. S.; Zak, B. (William Beaumont Hosp., Royal Oak, MI 48072). *Ann. Clin. Lab. Sci.* 8(1):34-41; 1978.

6801 [1-^{11}C]DL-VALINE, A POTENTIAL PANCREAS-IMAGING AGENT. (Eng.) Washburn, L. C.; Wieland, B. W.; Sun, T. T.; Hayes, R. L.; Butler, T. A. (Medical and Health Sciences Div., Oak Ridge Associated Univ., P.O. Box 117, Oak Ridge, TN 37830). *J. Nucl. Med.* 19(1):77-83; 1978.

6802 A COMPARISON OF COLONOSCOPY AND ROENTGENOGRAPHY FOR DETECTING POLYPOID LESIONS OF THE COLON. (Eng.) Leinicke, J. L.; Dodds, W. J.; Hogan, W. J.; Stewart, E. T. (Medical Coll. Wisconsin, Milwaukee, WI). *Gastrointest. Radiol.* 2(2): 125-128; 1977.

6803 THE DIAGNOSTIC VALUE OF PERCUTANEOUS LIVER BIOPSY IN PATIENTS WITH NON HODGKIN'S LYMPHOMA--A PRELIMINARY REPORT. (Eng.) Kolaric, K.; Roth, A.; Dominis, M.; Jakasa, V. (Central Inst. Tumors and Allied Diseases, Zagreb, Ilica 197 41000, Yugoslavia). *Acta Hepatogastroenterol. (Stuttg.)* 24(6):440-443; 1977.

6804 COMPARISON BETWEEN BOLUS INJECTION AND INFUSION OF SECRETIN AND PANCREOZYMIN IN THE DIAGNOSIS OF CHRONIC PANCREATIC DISEASE (ONE HOUR TEST). (Eng.) Farini, R.; Del Favero, G.; Adorati, M.; Pedrazzoli, S.; Fabris, G.; Giordano, P.; *et al.* (Clinica Medica I, Universita di Padova, 35100 Padova, Italy). *Acta Hepatogastroenterol. (Stuttg.)* 24(6):462-468; 1977.

6805 DIAGNOSTIC TOOLS IN THE MANAGEMENT OF CHRONIC PANCREATITIS. (Eng.) Mullens, J. E.; Salem, S. (Ottawa Civic Hosp., 1053 Carling Ave., Ottawa, Ontario K1Y 4E9, Canada). *Can. J. Surg.* 21(1):60-63; 1978.

6806 PRE-MEDICATION FOR ENDOSCOPY: A TRIAL OF ATROPINE, PENTAZOCINE OR PETHIDINE AS A SUPPLEMENT TO DIAZEPAM. (Eng.) Cook, P. J.; Bennett, P. N.; Lennard-Jones, J. E.; Warnes, T. W. (Univ. Coll. Hosp., London, England). *Scand. J. Gastroenterol.* 13(1):33-39; 1978.

6807 A COMPARISON OF A NEW NON-IONIC (METRIZAMIDE) AND A DISSOCIABLE (METRIZOATE) CONTRAST MEDIUM IN ENDOSCOPIC RETROGRADE PANCREATOGRAPHY (ERP). (Eng.) Osnes, M.; Skjennald, A.; Larsen, S. (Ulleval Hosp., Oslo 1, Norway). *Scand. J. Gastroenterol.* 12(7):821-825; 1977.

See also, 6762, 6810, 6820, 6833, 6837, 6877, 6887, 6894, 6906, 6919, 6933, 6937, 6938, 6939, 6942, 6945, 6951, 6966, 6974, 6982, 6984, 6985, 6989, 7030, 7031, 7036, 7038, 7043, 7045, 7054, 7060, 7071, 7072, 7076, 7078, 7081, 7083, 7084, 7115, 7128, 7138, 7160, 7172, 7173, 7174, 7175, 7176, 7183, 7187, 7191, 7192, 7200, 7205, 7211, 7216, 7239, 7245, 7246, 7261, 7268.

GASTROINTESTINAL DISEASES

ESOPHAGUS

6808 ESOPHAGEAL ATRESIA WITH DOUBLE TRACHEO-ESOPHAGEAL FISTULA. (Eng.) Goodwin, C. D.; Ashcraft, K. W.; Holder, T. M.; Johnson, F. R.; Amoury, R. A. (190 Grant St., Dayton, OH 45404). *J. Pediatr. Surg.* 13(3):269-273; 1978.

Four cases of esophageal atresia (EA) with double tracheoesophageal fistula (TEF) are presented, and the relevant literature is reviewed. All patients were boys, weighing 2,735 to 3,150 g. The first patient had an EA and distal TEF, which were treated by dividing the distal fistula and performing a single layer esophagoesophagostomy, using the extrapleural approach. A second TEF was found 9 days later at the C-7 level. In retrospect, the preoperative contrast swallow showed both a proximal and distal TEF. The upper fistula was divided through a transcervical approach. Transient paresis of the right recurrent laryngeal nerve complicated the infant's postoperative course. The second infant was also found to have a second TEF following surgery for EA and distal TEF. This TEF was discovered by esophagoscopy, following the injection of methylene blue into the endotracheal tube. Severe subglottic stenosis and tracheomalacia complicated this patient's course following surgery for the second TEF. A proximal TEF was discovered in the third patient during surgery for EA and distal TEF. Both fistulas were divided, and an esophageal anastomosis was performed under slight tension. He later had a fundoplication for an anastomotic stricture associated with severe gastroesophageal reflux. The last patient had definitive repair for EA and distal TEF delayed until the fourth day of life because of pneumonitis. At operation, the esophagus was in continuity but had a membranous atresia. A large distal TEF was divided, but because the atresia was membranous, the proximal esophagus was not mobilized. Esophagram and bronchoscopy following subsequent repeated episodes of respiratory infections associated with choking while feeding revealed a proximal fistula. A literature review, together with the present cases, suggests that TEF may be more common than is generally recognized and that diagnosis is difficult. During repair of EA and TEF, the proximal esophagus should be mobilized to detect additional TEF. The results of treatment should be good, since this problem occurs in large babies with fewer and less complex associated conditions.

6809 PANETH CELLS IN BARRETT'S ESOPHAGUS. (Eng.) Schreiber, D. S.; Apstein, M.; Hermos, J. A. (West Roxbury Veterans Admin. Hosp., Boston, MA). *Gastroenterology* 74(6):1302-1304; 1978.

Four patients with clinical and endoscopic evidence of inflammation or benign stricture of the esophagus in whom Paneth cells were identified in Barrett's epithelium of the specialized columnar type are reported. The cells were identical to human intestinal Paneth cells by light microscopy, electron microscopy, and histochemical staining reactions. A retrospective review of biopsies from eight additional patients with esophageal specialized columnar epithelium yielded two further cases with Paneth cells. The presence of Paneth cells, along with goblet cells, suggests that specialized columnar epithelium in the esophagus may be a form of highly differentiated intestinalization.

6810 LASER COAGULATION IN ACUTE GASTROINTESTINAL HEMORRHAGE. (Ger.) Kiefhaber, P.; Nath, G.; Moritz, K.; Kreitmair, A. (Medizinische Klinik der Innenstadt der Universitat, Ziemssenstr. 1, D-8000 Munchen 2, W. Germany). *Langenbecks Arch. Chir.* 345:303-306; 1977.

Emergency endoscopic coagulation with a Nd-Yag laser was performed in 198 acute gastrointestinal hemorrhages in 156 unselected patients with recurrent hemorrhages during a 1- to 5-yr period. It was possible to control the hemorrhage in 186 instances, which included 60 massive and protracted hemorrhages from varices of the esophagus, cardia, and stomach; 10 arterial and 4 capillary-venous hemorrhages in Mallory-Weiss syndrome; 57 arterial and 40 venous-capillary hemorrhages from esophageal, gastric, duodenal, and jejunal ulcers; 11 hemorrhages in multiple esophageal and gastric erosions; and 4 arterial and venous hemorrhages from colonic ulcers. Recurrent hemorrhages were seen in 18 patients with varices 3-30 days after laser coagulation; all defects were new. Recurrent hemorrhage from the coagulated defect was seen in only one patient (with Mallory-Weiss syndrome). The findings indicate the great value of endoscopic laser coagulation of gastrointestinal hemorrhage.

6811 GASTROESOPHAGEAL REFLUX IN INFANTS AND CHILDREN: A USEFUL CLASSIFICATION AND RELIABLE PHYSIOLOGIC TECHNIQUE FOR ITS DEMONSTRATION. (Eng.) McCauley, R. G. K.; Darling, D. B.; Leonidas, J. C.; Schwartz, A. M. (New England Medical Center Hosp., 171 Harrison Ave., Boston, MA 02111). *Am. J. Roentgenol.* 130(1):47-50; 1978.

A radiologic method for the demonstration of gastroesophageal reflux in children is described, and a clinically useful system for grading of reflux is presented. Colloidal barium sulfate (100 g in 200 ml water) is administered in a volume similar to a normal meal, and then spot films are taken in the lateral and supine positions to evaluate the swallowing mechanism and the contour and peristalsis of the barium-filled esophagus. Routine fluoroscopy and spot films of the stomach and duodenum are obtained with partial distention of the stomach. Additional barium is given, following which the gastroesophageal junction is examined using intermittent fluoroscopy and small fields and while turning the subject gently from side to side in a supine position. Reflux, if present, will be seen in the

majority of cases at this time, and its maximum extent can be recorded. Having the subject suck on a rubber nipple may aid in the demonstration of reflux. In the absence of reflux, hiatal hernia is looked for using thickened barium (75 g/25 ml water). After the subject has sat erect for 30 min, a delayed film is taken in the supine position and should include the lower half of the esophagus. The overall incidence of reflux in 507 patients was 40%; it was 64% among infants <3 months old. Most patients with reflux (70%) were under 1 yr of age. The grading system ranges from reflux into the distal esophagus only (grade 1) to reflux with aspiration into the trachea and lungs (grade 5). This method and system may be useful in understanding the true incidence and significance of gastroesophageal reflux.

6812 ESOPHAGEAL EPITHELIAL RESPONSE TO GASTROESOPHAGEAL REFLUX: A QUANTITATIVE STUDY. (Eng.) Johnson, L. F.; Demeester, T. R.; Haggitt, R. C. (Walter Reed Army Medical Center, Washington, DC 20012). *Am. J. Dig. Dis.* 23(6):498-509; 1978.

To examine the relationship between esophageal mucosal exposure to gastric acid, exposure of the distal esophageal mucosa to gastric juice was quantitated by 24-hr pH monitoring in 100 individuals and was correlated with morphologic data derived from esophageal biopsies. The degree of acid exposure to the distal esophagus (time exposed to pH <4) correlated directly with increases in both relative and absolute length of the subepithelial papillae ($r=0.333$, $p<0.01$ and $r=0.305$, $p<0.01$, resp.) and to relative basal zone hyperplasia ($r=0.261$, $p<0.05$). Both papillary length and basal zone hyperplasia decreased after antireflux surgery had reduced acid exposure to normal in the five patients studied. Reflux in the recumbent position resulted in prolonged exposure of the mucosa to acid because of poor acid clearing from the esophagus. This exposure caused longer papillae than did upright reflux, where there were more frequent reflux episodes, but with rapid acid clearance. The presence of a hiatal hernia was associated with longer papillae, lower distal esophageal sphincter pressure, increased reflux frequency, and prolonged recumbent acid clearance. Twenty-four hour pH monitoring correlated better with papillary length ($r=0.250$, $p<0.05$) than did symptoms or other clinical measures of gastroesophageal reflux. This study shows that the pH of refluxed gastric juice serves as a sensitive tag to assess two important determinants of reflux esophagitis: (a) reflux frequency secondary to incompetency of the cardioesophageal junction and (b) esophageal clearing of the refluxed gastric juice. Both of these components must be assessed in the future in determining benefit from a potential therapeutic measure.

6813 SURGICAL ACCOMPLISHMENTS IN ENHANCING LOWER ESOPHAGEAL SPHINCTERIC COMPETENCY. (Eng.) Woodward, E. R. (Univ. Florida Coll. Medicine, Gainesville, FL 32611). *South. Med. J.* 71 (Suppl. 1):38-40; 1978.

6814 COMPARISON OF ENDOSCOPY AND MANOMETRY IN ASSESSMENT OF LOWER ESOPHAGEAL SPHINCTER PRESSURE. (Eng.) Rafoth, R. J.; Freeland, G.; Pailey, P.; Anderson, D. S.; Fornes, M. F. (Naval Regional Medical Center, San Diego, CA 92134). *Gastrointest. Endosc.* 24(4):152-153; 1978.

6815 COMPARISON OF FIBEROPTIC ENDOSCOPE AND QUINTON TUBE ESOPHAGEAL BIOPSIES IN ESOPHAGITIS. (Eng.) Komorowski, R. A.; Leinicke, J. A. (Medical Coll. Wisconsin, 8700 W. Wisconsin Ave., Milwaukee, WI 53226). *Gastrointest. Endosc.* 24(4):154-155; 1978.

6816 SPONTANEOUS INTRAMURAL HEMATOMA OF ESOPHAGUS. (Eng.) Atefi, D.; Horney, J. T.; Eaton, S. B.; Shulman, M.; Whaley, W.; Galambos, J. T. (Emory Univ. Sch. Medicine, 69 Butler St., S.E., Atlanta, GA 30303). *Gastrointest. Endosc.* 24(4):172-174; 1978.

6817 OESOPHAGEAL VARICEAL BLEEDING IN FELTY'S SYNDROME ASSOCIATED WITH NODULAR REGENERATIVE HYPERPLASIA. (Eng.) Blendis, L. M.; Lovell, D.; Barnes, C. G.; Ritland, S.; Cattan, D.; Vesin, P. (Toronto General Hosp., Toronto, Ontario M5P 2J2, Canada). *Ann. Rheum. Dis.* 37:183-186; 1978.

6818 RESULTS OF INTERPOSITION "H" GRAFTS FOR PORTAL HYPERTENSION. (Eng.) Thompson, B. W.; Casali, R. E.; Read, R. C.; Campbell, G. S. (Veterans Admin. Hosp., 300 E. Roosevelt Rd., Little Rock, AR 72206). *Ann. Surg.* 187(5):515-520; 1978.

6819 BOERHAAVE'S SYNDROME. (Eng.) Landay, M. J.; Berk, R. N. (Univ. Texas Southwestern Medical Sch., Dallas, TX). *Am. J. Gastroenterol.* 69(2):212-219; 1978.

6820 AIR IN THE ESOPHAGUS: A FREQUENT RADIOLOGIC FINDING. (Eng.) Proto, A. V.; Lane, E. J. (Wilford Hall U.S. Air Force Medical Center, Lackland Air Force Base, TX 78236). *Am. J. Roentgenol.* 129(3):433-440; 1977.

6821 RADIOLOGIC ASPECTS OF BECK GASTRIC TUBE IN ESOPHAGEAL RECONSTRUCTION. (Eng.) Fetouh, S. A.; Daffner, R. H.; Postlethwait, R. W.; Millar, R. C. (Duke Univ. Medical Center, Durham, NC 27710). *Am. J. Roentgenol.* 129(3):425-431; 1977.

6822 THE JET PHENOMENON: A MANIFESTATION OF ESOPHAGEAL WEB. (Eng.) Shauffer, I. A.; Phillips, H. E.; Sequeira, J. (Boston Univ.

Sch. Medicine, 818 Harrison Ave., Boston, MA 02118). *Am. J. Roentgenol.* 129(4):747-748; 1977.

6823 PRIMARY ULCERATIVE CARCINOMA OF THE ESOPHAGUS. (Eng.) Gloyna, R. E.; Zornoza, J.; Goldstein, H. M. (Univ. Texas System Cancer Center, Houston, TX 77030). *Am. J. Roentgenol.* 129(4):599-600; 1977.

6824 ACUTE UPPER GASTROINTESTINAL BLEEDING DUE TO AORTOESOPHAGEAL FISTULA, DUE TO BOECK'S SARCOID. (Eng.) Staves, N. P. (South Side Medical-Surgical Clinic, Milwaukee, WI). *Abdom. Surg.* 19(9):206-207; 1977.

6825 INTRALUMINAL DIVERTICULUM OF THE ESOPHAGUS. (Eng.) Schreiber, M. H.; Davis, M. (Univ. Texas Medical Branch, Galveston, TX 77550). *Am. J. Roentgenol.* 129(4):595-597; 1977.

6826 EXPERIMENTAL FUNDOPLICATION: COMPARISON OF RESULTS OF DIFFERENT TECHNIQUES. (Eng.) Leonardi, H. K.; Ellis, F. H., Jr.; Cormack, J.; Gorrilla, M. (Lahey Clinic Foundation, 605 Commonwealth Ave., Boston, MA 02215). *Surgery* 82(4):514-520; 1977.

6827 THE RADIOLUCENT ESOPHAGEAL FOREIGN BODY: AN OFTEN-FORGOTTEN CAUSE OF RESPIRATORY SYMPTOMS. (Eng.) Newman, D. E. (Vancouver General Hosp., 855 W. 12th Ave., Vancouver, British Columbia V5Z 1M9, Canada). *J. Pediatr.* 92(1):60-63; 1978.

6828 INTRAOPERATIVE MEASUREMENT OF LOWER ESOPHAGEAL SPHINCTER PRESSURE. (Eng.) Hill, L. D. (Mason Clinic, 1118 Ninth Ave., Seattle, WA 98101). *J. Thorac. Cardiovasc. Surg.* 75(3):378-382; 1978.

6829 AN APPROACH TO THE SURGICAL TREATMENT OF CARCINOMA OF THE OESOPHAGUS AND CARDIA. (Eng.) Gatzinsky, P.; Bergh, N. P.; Dernevik, L.; Larsson, S. (Sahlgren's Hosp., Goteborg, Sweden). *Acta Chir. Scand.* 143(6):341-345; 1977.

6830 MEGAESOPHAGUS AND PNEUMONIA ASSOCIATED WITH Mycobacterium chelonei: A CASE REPORT AND A LITERATURE REVIEW. (Eng.) Burke, D. S.; Ullian, R. B. (Walter Reed Army Inst. Res., Washington, DC 20012). *Am. Rev. Respir. Dis.* 116(6):1101-1107; 1977.

6831 THE SIGNIFICANCE OF RIGHT AORTIC ARCH IN REPAIR OF ESOPHAGEAL ATRESIA AND TRACHEO-ESOPHAGEAL FISTULA. (Eng.) Harrison, M. R.; Hanson, B. A.; Mahour, G. H.; Takahashi, M.; Weitzman, J. J. (Children's Hosp. Los Angeles, 4650 Sunset Blvd., Los Angeles, CA 90027). *J. Pediatr. Surg.* 12(6):861-869; 1977.

6832 ACHALASIA OF THE OESOPHAGUS TREATED BY PNEUMATIC DILATATIONS, HELLER-OPERATION AND COLON INTERPOSITION. (Eng.) Van Walleghem, J.; Booy, A. Ph.; Van Houten, H. (Good-Engels Children's Hosp., Antwerp, Belgium). *Acta Chir. Belg.* (6):539-552; 1977.

See also, 6602, 6790, 6791, 6850, 6888, 6889, 6892, 6941, 7221, 7242.

STOMACH

6833 THE ORIGIN OF THE LEFT GASTRIC ARTERY. (Eng.) Naidich, J. B.; Naidich, T. P.; Sprayregen, S.; Hyman, R. A.; Pudlowski, R. M.; Stein, H. L. (North Shore Univ. Hosp., 300 Community Drive, Manhasset, NY 11030). *Radiology* 126(3):623-626; 1978.

To investigate variations in the origin of the left gastric artery (LGA), the origin and visualization of the artery were evaluated retrospectively in 500 consecutive angiograms that included at least one selective study of the celiac trunk or the leinogastric trunk. If there was any doubt about the visualization or origin, the LGA was considered as not visualized. The LGA could not be identified in 40 cases. In nine cases, the LGA originated directly from the aorta, and the phrenic artery arose as a branch of the LGA. In one case, the LGA originated from the superior mesenteric artery. In 450 cases, the LGA arose from the celiac or leinogastric trunk, and the orifice was well seen in 378. The orifice was visible in 218/220 patients in whom both anteroposterior and right posterior oblique projections were obtained but in only 160/230 in whom only the anteroposterior projection was obtained. In 373/378 patients, the LGA was a single vessel arising from the celiac or leinogastric trunk anywhere between its origin and its bifurcation in-

to the hepatic and splenic arteries; in 1, the LGA arose from the splenic artery; in 2, it arose from the hepatic artery; and in 2 patients, 2 LGAs of almost equal caliber arose from the celiac artery. In 102 patients, the LGA supplied both the stomach and the liver to varying extents. Anomalous origin of the LGA can lead to failure to visualize it in arteriograms or to complications in catheterization therapy of gastrointestinal hemorrhage.

6834 DOUBLE CHANNEL PYLORUS. (Eng.) Jamshidnejad, J.; Koehler, R. E.; Narayan, D. (Washington Univ. Sch. Medicine, St. Louis, MO 63110). *Am. J. Roentgenol.* 130(6):1047-1050; 1978.

The radiographic and clinical features in five patients with double channel pylorus are presented and compared with those in previously reported cases of this deformity. The patients ranged in age from 64 to 76 yr. The anomaly was confirmed endoscopically in four patients and at surgery in one. All patients had epigastric pain and symptoms consistent with peptic ulcer disease. None exhibited evidence of gastric outlet obstruction. Three patients underwent gastrectomy. The radiographic examination revealed barium outlining two channels connecting the antrum with the base of the duodenal bulb in all cases. A fistulous channel passed through the lesser curvature aspect of the pylorus and entered the superior fornix of the duodenal bulb. The two channels were separated by a bridge or septum. In each case, an ulcer crater was seen along the superior aspect of the prepyloric antrum or duodenal bulb. Since the double channel pylorus was shown not to have been present on prior upper gastrointestinal radiographs or endoscopy in 15 previous and 2 current cases and since most cases occur in older subjects, the lesion is probably an acquired peptic deformity in most instances.

6835 UPPER GASTROINTESTINAL BLEEDING IN THE INTENSIVE CARE UNIT. (Eng.) MacDonald, A. S.; Pyne, D. A.; Freeman, A. N. G.; Holland, S. G.; Badley, B. W. D. (Clinical Res. Center, 5849 University Ave., Halifax, Nova Scotia B3H 1W2, Canada). *Can. J. Surg.* 21(1):81-84; 1978.

The pathogenesis, diagnosis, and treatment of upper gastrointestinal bleeding secondary to conditions requiring intensive care are summarized. The clinical conditions that precede erosive gastritis are shock, sepsis, organ failure (kidney, liver, lung), drug ingestion (acetylsalicylic acid, alcohol, corticosteroids), and elevated intracranial pressure, and in the majority of patients, more than one factor is involved. Those patients that bleed from the erosions are distinguished from those who do not by continuation of the stressful situation that led to the erosions. The mechanisms of these pathogenetic conditions are not entirely clear. Bleeding is the identifying symptom of erosive gastritis; the most important diagnostic tool is fiberoptic endoscopy. Barium contrast roentgenography is not helpful. At endoscopy, early in the illness, one finds numerous punctate areas of hemorrhage, typically most intense along the lesser curvature and over the posterior wall of the fundus. The antrum is often spared, but the duodenum is often involved, sometimes alone. As the illness progresses, the erosions enlarge and coalesce, forming a large serpiginous shallow ulcer, and they may deepen. The drug-precipitated entity responds to simple lavage with ice water and oral antacids. Treatment of other patients has not been consistently successful. The histamine H_2-receptor antagonist, cimetidine, was used in an uncontrolled trial in 27 patients with erosive gastritis; bleeding stopped in 24. Based on clinical experiences with both metiamide and cimetidine, the authors recommend conservative surgery. In those who continue to bleed despite the administration of H_2 blockers, discrete ulcers are present that can be managed by suture ligation or excision, followed by vagotomy and drainage and continuous cimetidine therapy until the stressful situation has passed.

6836 GASTRIC STUMP CANCER: STATISTICAL EVALUATION. (Eng.) Cheli, R.; Molinari, F.; Santi, L.; Ciancamerla, G.; Puntoni, R. (Ospedale Generale Regionale, Viale Benedetto XV, 16132 Genova, Italy). *Rend. Gastroenterol.* 9(3): 169-172; 1977.

To determine the relationship between gastric surgery and the development of gastric stump cancer, the mortality due to cancer and other causes was analyzed in 180 patients who underwent resection for gastric ulcer and 337 patients who underwent resection for duodenal ulcer. The mortality rate for gastric stump cancer was 2% in the patients who underwent resection for duodenal ulcer and 5% for those who underwent surgery for gastric ulcer. A statistical analysis showed a highly significant increase ($p<0.001$) in mortality, in relation to the total population of Genoa, for gastric stump cancer in both groups. There was also a significantly higher ($p<0.005$) mortality from extragastric tumors among the patients who underwent surgery for ulcer than in the general population.

6837 PLASMACYTOMA OF THE STOMACH. (Eng.) Scott, F. E. T.; Dupont, P. A.; Webb, J. (Wexham Park Hosp., Slough, Berkshire, England). *Cancer* 41(2):675-681; 1978.

Three cases of undoubted plasma cell tumor of the stomach that had been diagnosed histologically were re-examined by the immunoperoxidase (IP) staining technique to confirm the diagnosis by demonstrating a single type of immunoglobulin in the tumor cell using formalin-fixed, paraffin-embedded tissue from the original biopsies. The detailed case reports are presented. Sections of benign plasma cell granuloma were used as a nonspecific positive control. One patient with a tumor that was confined to the stomach and one in whom a palliative partial gastrectomy had been performed for the removal of a large tumor of the distal third of the stomach with extensive lymphatic but no skeletal involvement had tumor cells that stained

heavily with the IP technique, revealing high concentration of Russell bodies that contained exclusively IgG heavy chains and K-type light chains. Blood and urine specimens from the second patient had shown no excess of a single immunoglobulin type. IP staining of tissue from a patient with plasmacytoma of the stomach in which a dense mass of malignant plasma cells extended completely through the muscle layer and in whom skeletal involvement occurred 2 yr after resection revealed exclusively IgA heavy chains and K-type light chains but no Russell bodies. Sixty-six cases of primary gastric tumor reported in the literature are reviewed, and the pathology of plasma cell tumors is discussed. The demonstration of intracellular immunoglobulins permits a firm distinction to be made between true plasma cell tumors and reactive plasma cell granulomas on the one hand and the other types of malignant lymphoma on the other.

6838 ACUTE GASTRIC DILATATION IN NEGLECTED CHILDREN. (Eng.) Franken, E. A.; Fox, M.; Smith, J. A.; Smith, W. L. (Indiana Univ. Medical Center, 1100 West Michigan St., Indianapolis, IN 46202). *Am. J. Roentgenol.* 130(2):297-299; 1978.

Acute gastric dilatation as a manifestation of child neglect and abuse is reported. Acute sudden gastric dilatation developed in each of five children (ages 2-8 yr) after the ingestion of a large meal. The height and weight of all patients were below the third percentile, and all had "voracious" or "huge" appetites, and historic evidence of deprivation and/or of neglect, and physical abuse. The pathogenesis of acute gastric atony in the deprived child is related to structural and functional changes in the stomach due to chronic starvation. Treatment of the gastric distention involves decompression of the stomach by nasogastric intubation, appropriate i.v. fluids to counteract shock, and slow resumption of small but frequent p.o. feedings after 12-24 hr. Radiographic recognition of acute gastric dilatation in a child who is not postoperative or intoxicated should suggest the presence of chronic starvation and child neglect. Prevention of further neglect requires social management of the entire family.

6839 THE FURTHER INVESTIGATION ON THE GASTRIC ACID SECRETION IN THE PRIMARY HYPERPARATHYROIDISM. (Eng.) Segawa, K.; Nakazawa, S.; Naito, Y.; Imai, K.; Yamase, H.; Yamada, K.; *et al.* (Nagoya Univ. Sch. Medicine, Tsuruma-cho, Showa-ku, Nagoya, 466 Japan). *Gastroenterol. Jpn.* 12(5):347-351; 1977.

Gastric output was studied in 11 patients with hyperparathyroidism before and 10-114 days after parathyroidectomy to further investigate the relationship between serum calcium level on one hand and serum gastrin level and gastric secretion on the other. The serum calcium level fell significantly after the operation (from 5.96 ± 0.18 mEq/l to 4.19 ± 0.17 mEq/l, $p<0.001$). The serum gastrin level, basal gastric output (BAO), and maximal gastric output (MAO) also decreased significantly after operation (from 167.00 ± 7.08 to 73.40 ± 24.21 pg/ml, from 1.74 ± 0.64 to 0.42 ± 0.26 mEq/hr, and from 5.66 ± 2.29 to 2.13 ± 1.45 mEq/hr, resp., $p<0.05$, $p<0.001$, and $p<0.02$, resp.). Serum alkaline phosphatase (AP) activity appeared to be an indicator of the duration of the disease, rising with longer durations. In patients with AP activity >20 Kind-King (KK) U, BAO and MAO were 1.00 ± 0.55 and 4.86 ± 2.46 mEq/hr, resp.; in patients with AP activity <20 KKU, BAO and MAO were 1.87 ± 0.97 and 8.43 ± 3.43 mEq/hr, resp. In five of the patients, the BAO and MAO were measured a second time between 67 and 391 days after the first postoperative study; both values had increased compared with the first study results, and both approached preoperative values. The authors postulate that the adaptation of the parietal cell to hypercalcemia prior to operation (i.e., producing normal gastric secretion levels despite the elevated stimulus) leads to decreased secretion after operation because of the lowered serum calcium level and then as the parietal cells readapt over time to the new level of serum calcium, the gastric secretion increases to normal.

6840 RECURRING HYPERPLASTIC GASTRIC POLYPS FOLLOWING SUBTOTAL GASTRECTOMY. (Eng.) Joffe, N.; Goldman, H.; Antonioli, D. A. (Harvard Medical Sch., 300 Brookline Ave., Boston, MA 02215). *Am. J. Roentgenol.* 130(2):301-305; 1978.

The clinical, radiologic, and pathologic findings in two cases of recurring symptomatic hyperplastic gastric polyps after subtotal gastrectomy are presented. In a 30-yr-old woman, the initial surgery was undertaken for treatment of peptic ulcer disease. In a 34-yr-old woman, a patient with known pernicious anemia, the indication for surgery was multiple antral polyps. Within 2 yr after surgery, both patients developed multiple hyperplastic polyps in the gastric remnant. Repeated endoscopic and barium examinations over a 7- to 8-yr period revealed a progressive increase in the size and number of these polyps with formation of large conglomerate masses in the gastric remnant immediately proximal to the gastrojejunostomy stoma. Surgical or transendoscopic removal of the polyps was indicated by severe symptoms on several occasions: the first patient experienced intermittent epigastric pain, vomiting, and gastrointestinal hemorrhage; during one episode of severe vomiting, an entire polyp was ejected; and the second patient had symptoms of intermittent gastric outlet obstruction produced by prolapse of a large polyp through the stoma into the jejunum. It is proposed that reflux bile gastritis may have played an important etiologic role in the development of these recurring hyperplastic polyps.

6841 ELECTRON MICROSCOPIC OBSERVATIONS IN INFANTILE HYPERTROPHIC PYLORIC STENOSIS (IHPS). (Eng.) Jona, J. Z. (411 East Mason St., Milwaukee, WI 53202). *J. Pediatr. Surg.* 13(1): 17-20; 1978.

The ultrastructural appearance of the parasympathetic ganglia, the supporting interstitial cells, and smooth muscles in infantile hypertrophic pyloric stenosis (IHPS) is summarized. Tissue obtained at pyloromyotomy from five infants (ages 3-5 weeks) with typical clinical, radiologic, and operative findings of IHPS and from 2-week-old infant rabbits, adult rabbits, and rats was prepared for electron microscopic examination. In all, 35 plexuses of human origin were studied in this material, and the animal material permitted evaluation of the morphology and maturation changes in the pyloric ganglia. On the whole, no abnormalities were found in the neurons or interstitial cells of the infants. Occasionally (<10% of the total), a very large axon was observed, measuring 2-3 times the diameter of normal large axons. Intrinsic derangement of the organelles and axolemma of these axons was seen. The cytoplasm of the supporting cells contained small filaments and radiating processes that enveloped a group of axons or part of the neuron's surface. There was a marked increase in the overall thickness of the circular smooth muscles of the pylorus. The animal control material resembled the human material in most respects. The small, immature ganglia in the infant rabbits, which resembled those in the babies, disappeared in the older animals, suggesting that the maturation process followed a normal course in babies with IHPS. It is concluded that degenerative changes or failure of maturation of the ganglia cannot account for the clinical syndrome of IHPS.

6842 CONGENITAL HYPERTROPHIC PYLORIC STENOSIS: THE ROLE OF GASTRIN REEVALUATED. (Eng.) Werlin, S. L.; Grand, R. J.; Drum, D. E. (Children's Hosp. Medical Center, 300 Longwood Ave., Boston, MA 02115). *Pediatrics* 61(6):883-885; 1978.

To evaluate the potential role of gastrin in the etiology of congenital hypertrophic pyloric stenosis, serum gastrin levels were measured in cord blood of affected infants, matched controls, and mothers of both. Cord and maternal sera were available from 40 of the 51 maternal-infant pairs in which pyloric stenosis developed in the infant in a study of 59,508 pregnancies. No differences were identified when values from infants with pyloric stenosis were compared with those from control infants (117 ± 10 and 115 ± 8 pg/ml, resp.). The mean cord serum gastrin level of all infants (116 ± 9 pg/ml) was significantly greater than the mean maternal gastrin level (93 ± 8 pg/ml, $p<0.001$). The data effectively dismiss the possibility that elevated serum gastrin concentration in mother or infant at the time of delivery can be implicated as a cause of congenital pyloric stenosis.

6843 TRIMIPRAMINE IN THE TREATMENT OF GASTRIC ULCER. (Eng.) Valnes, K.; Myren, J.; Qvigstad, T. (Ulleval Hosp., Oslo, Norway). *Scand. J. Gastroenterol.* 13(4):497-500; 1978.

A double-blind study comparing trimipramine with placebo during 4 weeks of treatment was carried out in 40 patients with confirmed gastric ulcers. The daily dose of trimipramine was 50 mg p.o. given at bedtime. No serious side-effects occurred. After 4 weeks of treatment, endoscopy showed that 12 of the 20 patients receiving trimipramine had completely healed ulcers, while only 4 of the 20 ulcers in the patients who received placebo were healed ($p=0.025$). A significant improvement in the patients' assessment of the results of treatment (i.e., better, unchanged, or worse) was also observed in the patients receiving trimipramine ($p=0.025$). It is assumed that the previously reported antisecretory effect of the drug, together with its sedative and anti-depressant effect, make trimipramine valuable in the treatment of peptic ulcer disease.

6844 GASTRODUODENAL ULCERATION IN RENAL TRANSPLANT PATIENTS. (Eng.) Schweizer, R. T.; Bartus, S. A. (Hartford Hosp., Hartford, CT 06115). *Conn. Med.* 42(2):85-88; 1978.

Gastroduodenal ulceration was reviewed retrospectively in 200 consecutive renal transplant patients, and a prospective study of this entity was undertaken (113 patients enrolled to date) to determine whether antacid therapy and prophylactic gastric surgery can reduce the incidence and severity of this complication. The 200 patients received antacid therapy as often as every hour during the day, concomitant with large doses of steroids and every 2 hr at night. Prophylactic surgery (usually vagotomy and pyloroplasty) were performed in all patients who had a documented duodenal or gastric ulcer prior to receiving the kidney transplant. The patients in the prospective study were similarly treated. Of the 200 patients, 25 developed upper gastrointestinal ulceration following renal transplant, 12 of the 25 had significant hemorrhage, and 2 of the 12 died; all had had infrequent antacid therapy for various reasons preceding the bleeding episode, 9/12 had received very large corticosteroid doses for rejection episodes, and 2/12 had previously undisclosed histories of previous ulcer disease. Of the remaining 13/25 patients, 1 required plication for perforation of a gastric ulcer, and the others responded to increased antacid therapy plus decreased corticosteroid dosage. Of the 113 patients, 9 required treatment for gastrointestinal ulceration (vagotomy and pyloroplasty in 5; vagotomy and antrectomy in 1; plication and then gastrectomy in 1; plication, vagotomy, and pyloroplasty in 1; and cimetidine therapy in 1); all 9 patients lost their transplants. The greatest risk of ulceration appears to occur when the prednisone maintenance dose is >60 mg/day. The incidence of gastrointestinal ulceration can be kept at a minimum through the use of prophylactic surgery and antacid administration; preventive measures and aggressive therapy are also important factors in achieving a low mortality.

6845 PREPYLORIC GASTRIC ANTRAL WEB: A PUZZLING EPIDEMIC. (Eng.) Bell, M. J.;

Ternberg, J. L.; Keating, J. P.; Moedjona, S.; McAlister, W.; Shackelford, G. D. (St. Louis Children's Hosp., 500 South Kingshighway, St. Louis, MO 63110). *J. Pediatr. Surg.* 13(3):307-313; 1978.

The spectrum of manifestations and appropriate therapy were studied in an unusual clustering of 28 infants and children in whom a radiographic diagnosis of antral web was made during a 26-month period. Nonbilious, often projectile vomiting was the predominant presenting symptom in 24 infants who were less than 6 months of age. The older children complained of pain, vomiting, fullness after eating, and eructation. The characteristic radiologic finding was a wire-like transverse septum 1-2 cm proximal to the pylorus. Poor antral filling was an important early clue in the radiographic search for the webs. Pyloroplasty was performed in 20 patients, frequently after failure of medical management of symptoms. Coexistent congenital abnormalities were present in 28% of patients. A search for environmental and familial factors has failed to elucidate any teratogenic influences in this population.

6846 THE CLINICAL SPECTRUM OF STRESS ULCERS IN PATIENTS WITH CANCER [Abstract]. (Eng.) Chait, M.; Turnbull, A.; Winawer, S. J. (Memorial Sloan-Kettering Cancer Center, New York, NY). *Gastroenterology* 72(5, Part 2):1037; 1977.

6847 AN IMPROVED TECHNIQUE FOR TOTAL GASTRECTOMY. (Eng.) Hutson, D. G.; Zeppa, R.; Levi, J. U.; Livingstone, A. (No affiliation given). *Surg. Gynecol. Obstet.* 145(2):249-251; 1977.

6848 THE EFFECT OF AMINO ACIDS, CARBOHYDRATE AND FAT EMULSION ON THE METABOLISM IN GASTRECTOMIZED PATIENTS. (Eng.) Fujita, T.; Matsumoto, Y. (Aichi Medical Univ., Nagakute-cho, Aichigun, Aichi Prefecture, Japan). *Jpn. J. Surg.* 7(1): 1-9; 1977.

6849 VARIOUS DEGREES OF DEMENTIA IN A SELECTED GROUP OF GASTRECTOMIZED PATIENTS WITH LOW SERUM B_{12}. (Eng.) Roos, D.; Willanger, R. (Dept. Neurology, Univ. Copenhagen, Copenhagen, Denmark). *Acta Neurol. Scand.* 55(5):363-376; 1977.

6850 THE EVALUATION OF DUMPING AND DIARRHOEA AFTER GASTRIC SURGERY USING A PHYSIOLOGICAL TEST MEAL. (Eng.) Whitehouse, G. H.; Temple, J. G. (Dept. Radiodiagnosis, Univ. Liverpool, Liverpool, England). *Clin. Radiol.* 28(2):143-149; 1977.

6851 EFFECT OF WATER AND FAT ON GASTRIC EMPTYING OF SOLID MEALS IN MAN [Abstract]. (Eng.) Kroop, H. S.; Long, W. B.; Hansell, J. R.; Alavi, A. (Univ. Pennsylvania Sch. Medicine, Philadelphia, PA 19104). *Gastroenterology* 72(5, Part 2): 1085; 1977.

6852 GASTRIC PANCREATIC & BILIARY SECRETION & GASTRIC EMPTYING AFTER PARIETAL CELL VAGOTOMY (PCV) [Abstract]. (Eng.) Lavigne, M. E.; Wiley, Z. D.; Martin, P.; Way, L. W.; Meyer, J. H.; MacGregor, I. L. (Veterans Admin. Hosp., San Francisco, CA). *Gastroenterology* 72(5, Part 2):1087; 1977.

6853 FACTORS RELATED TO THE INCIDENCE OF STOMACH CANCER IN THE PITTSBURGH STANDARD METROPOLITAN STATISTICAL AREA. (Eng.) Lerer, T. J.; Redmond, C. K.; Campbell, J. (Dept. Biostatistics, 318 Parran Hall, Graduate Sch. Public Health, 130 DeSoto St., Univ. Pittsburgh, Pittsburgh, PA 15261). *J. Natl. Cancer Inst.* 59(4): 1065-1071; 1977.

6854 THREAD SUTURES SEEN ON GASTROSCOPY: DO THEY CAUSE ULCERS OR INDIGESTION? (Eng.) Hoare, A. M.; Alexander-Williams, J. (United Birmingham Hosp., Birmingham B15 2TH, England). *Br. Med. J.* 2(6093):996-997; 1977.

6855 MENETRIER'S DISEASE DIAGNOSED BY ELECTROSURGICAL SNARE BIOPSY. (Eng.) Bjork, J. T.; Geenen, J. E.; Komorowski, R. A.; Soergel, K. H. (Milwaukee County General Hosp., 8700 W. Wisconsin Ave., Milwaukee, WI 53226). *JAMA* 238(16):1755-1756; 1977.

6856 MEDICAL TREATMENT OF THE POSTGASTRECTOMY BEZOAR: REPORT OF FOUR CASES TREATED WITH A CELLULOSE ENZYME PREPARATION AND REVIEW. (Eng.) Wortzel, E.; Ferrer, J. P.; DeLuca, R. F. (Jackson Memorial Hosp., Miami, FL). *Am. J. Gastroenterol.* 67(6):565-569; 1977.

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See also, 6602, 6633, 6635, 6639, 6640, 6644, 6646, 6652, 6661, 6770, 6776, 6788, 6790, 6799, 6810, 6811, 6812, 6902, 6904, 6905, 6906, 6908, 6909, 6910, 6941, 6972, 7076, 7221, 7222, 7229, 7242, 7244.

6897 CIMETIDINE FOR ULCERS RECURRING AFTER GASTRIC SURGERY. (Eng.) Hoare, A. M.; Jones, E. L.; Hawkins, C. F. (Queen Elizabeth Hosp., Birmingham B15 2TH, England). *Br. Med. J.* 1(6123): 1325-1326; 1978.

The effect of cimetidine therapy was studied in 20 patients with recurrent ulcers following gastric surgery, to discover if this drug will encourage healing of these ulcers even if the acid output is low. Before treatment, the mean peak acid output was 23.4 mmol/hr; five patients had a peak output of less than 10 mmol/hr and three less than 2.5 mmol/hr. Endoscopy was carried out before and after 6 weeks of cimetidine therapy (200 mg t.i.d. with meals and 400 mg at night). Endoscopy was repeated after a further 6 weeks of treatment if the ulcer had not healed during the first 6 weeks. After 6 weeks, 17 ulcers had healed, and after 12 weeks, 19 had healed. The results suggest that cimetidine aids in ulcer healing, even if the acid output is low.

6898 CIMETIDINE FOR RECURRENT ULCER AFTER VAGOTOMY OR GASTRECTOMY: A RANDOMISED CONTROLLED TRIAL. (Eng.) Kennedy, T.; Spencer, A. (Royal Victoria Hosp., Belfast BT12 6BA, Northern Ireland). *Br. Med. J.* 1(6122):1242-1243; 1978.

In a randomized controlled trial, 6 weeks of therapy with cimetidine (1 g/day) was compared with placebo in the treatment of recurrent ulcers after gastrectomy or vagotomy for duodenal ulcer. Healing, assessed endoscopically, was seen in 7 of 12 patients given cimetidine and in 5 of 12 controls. Four controls whose ulcers did not heal were subsequently treated with cimetidine, and in two, the ulcers healed after 6 weeks. Pain recorded by the patient and consumption of alkalis were each slightly but not significantly less in the cimetidine-treated patients. When cimetidine is to be used for recurrent ulceration, the dosage and duration of treatment should probably be increased.

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6900 PRINCIPLES AND METHODS OF SURGICAL MANAGEMENT OF UNCOMPLICATED DUODENAL ULCER. (Fre.) Reymond, J. C. (No affiliation given). *Rev. Prat.* 28(5):345-355, *passim;* 1978.

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6902 SECRETORY FUNCTION OF THE STUMP OF THE RESECTED STOMACH AFTER RECENT SURGERY FOR PEPTIC ULCER. (Rus.) Mumladze, R. B.; Valiev, M. A. (Clinical Hosp. No. 2, Moscow, USSR). *Sov. Med.* (8):150-153; 1977.

6903 USE OF ANTIPERISTALTIC SMALL INTESTINAL SEGMENTS IN THE SURGICAL TREATMENT OF PEPTIC ULCER AND POSTRESECTION SYNDROMES: A REVIEW OF THE LITERATURE. (Rus.) Kazimirov, L. I. (Surgical Clinic, Gor'kii Medical Inst., Gor'kii, USSR). *Khirurgiia (Mosk.)* (10):138-141; 1977.

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6913 VAGOTOMY AND DRAINAGE FOR ELECTIVE TREATMENT OF PEPTIC ULCERS. (Eng.) McGregor, D. B.; Savage, L. E.; McVay, C. B. (Yankton Clinic, Yankton, SD). *Surg. Gynecol. Obstet.* 146(3):349-352; 1978.

6914 EFFECT OF H_2-RECEPTOR ANTAGONISTS ON GASTRIC ACID SECRETION AND SERUM GASTRIN CONCENTRATION: A REVIEW. (Eng.) Richardson, C. T. (Univ. Texas Southwestern Medical Sch., Dallas, TX 75235). *Gastroenterology* 74(2, Part 2):366-370; 1978.

6915 CIMETIDINE IN THE TREATMENT OF DUODENAL ULCER: REVIEW AND COMMENTARY. (Eng.) Winship, D. H. (Univ. Missouri, Sch. Medicine, Columbia, MO 65201). *Gastroenterology* 74(2, Part 2): 402-406; 1978.

6916 LONG TERM CIMETIDINE IN THE MANAGEMENT OF SEVERE DUODENAL ULCER DYSPEPSIA. (Eng.) Gray, G. R.; Smith, I. S.; Mackenzie, I.; Gillespie, G. (Victoria Infirmary, Glasgow, Scotland). *Gastroenterology* 74(2, Part 2):397-401; 1978.

6917 SYMPOSIUM ON PEPTIC ULCER DISEASE. 1. MEDICAL TREATMENT OF PEPTIC ULCER. (Eng.) Jeejeebhoy, K. N. (Dept. Medicine, Univ. Toronto, Rm. 6352, Medical Sciences Building, Toronto, Ontario M5S 1A8, Canada). *Can. J. Surg.* 21(1):17-18; 1978.

6918 NEW APPROACHES TO THE PATHOGENESIS OF PEPTIC ULCER BASED ON THE PROTECTIVE ACTION OF SALIVA WITH SPECIAL REFERENCE TO ROUGHAGE, VEGETABLE FIBRE AND FERMENTED MILK PRODUCTS. (Eng.) Malhotra, S. L. (Chief Medical Officer, South Eastern Railway, Calcutta 43, India). *Med. Hypotheses* 4(1):1-14; 1978.

See also, 6633, 6635, 6639, 6644, 6795, 6810, 6834, 6856, 6859, 6878, 6889, 6891, 6966, 7065, 7221, 7222.

SMALL INTESTINE

6919 RADIOLOGICAL MANIFESTATIONS OF SMALL INTESTINAL SOUTH AMERICAN BLASTOMYCOSIS. (Eng.) Avritchir, Y.; Perroni, A. A. (Faculdade de Ciencias Medicas da Santa Casa de Sao Paulo, Sao Paulo, Brazil). *Radiology* 127(3):607-609; 1978.

The small intestinal radiological findings in three cases of South American blastomycosis (SAB), caused by *Paracoccidioides brasiliensis*, are reported. In a 23-yr-old patient, a barium enema revealed a conical, nondistensible cecum and rigid terminal ileum without ulceration. A second patient had dilatation of the intestinal wall in a small bowel series performed at age 20 yr; 4 yr later, a small intestinal series showed multiple long stenotic areas in the jejunum. A barium enema in a 36-yr-old patient revealed contraction at the cecal tip and a distensible terminal ileum with large, somewhat nodular folds. Thus, the radiologic findings of small intestinal SAB are nonspecific, e.g., fixed narrowing and mucosal irregularities. Differential diagnostic possibilities include regional enteritis, tuberculosis, and lymphoma, but when a patient lives in an endemic area, SAB should also be considered. None of the above three cases was correctly diagnosed before laparotomy, when *P. brasiliensis* was always found. A retrospective review of the postmortem findings of 13 patients with SAB during a 6-yr period revealed 3 patients with involvement of the small intestine, supporting the contention that such involvement is more common than has been previously considered.

6920 HEMORRHAGIC DUODENITIS: CLINICAL PROFILE. (Eng.) Bartolomeo, R. S.; Frank, H. D.; Taubin, H. L. (222 Station Plaza North, Mineola, NY 11501). *N.Y. State J. Med.* 78(2):212-214; 1978.

The clinical findings in 44 patients with hemorrhagic duodenitis are reviewed in a retrospective study. The mean age at presentation was 49.2 yr, and the major symptoms were melena (52.3%), epigastric pain (47.7%), and hematemesis (45.5%). The most common endoscopic findings were marked hyperemia (65.9%), friability (50%), and active hemorrhage (38.6%). The upper gastrointestinal barium meal findings were interpreted as normal in 75% of the 45 upper gastrointestinal series performed. The remainder had radiographic signs confined to the duodenal bulb, consisting of spasticity and irritability of the bulb or hypertrophied duodenal folds. A history of aspirin or aspirin-containing product ingestion was found in 68% of patients 1 week prior to admission. A history of alcohol ingestion was obtained in 34% 1 week prior to admission. Forty-five percent of the patients required blood transfusions, but only one required surgical intervention because of persistent uncontrolled hemorrhage. The only death was in a patient with Bernard-Soulier platelet disorder, while the other 42 cases responded to conservative medical management. Definitive diagnosis of hemorrhagic duodenitis is dependent on direct endoscopic visualization of the mucosa. Cessation of bleeding is to be expected with conservative management.

6921 MALIGNANT LYMPHOMA AND EXTENSIVE VIRAL WART FORMATION IN A PATIENT WITH INTESTINAL LYMPHANGIECTASIA AND LYMPHOCYTE DEPLETION. (Eng.) Ward, M.; Small, W. P.; Le Roux, A.; Sircus, W. (Western General Hosp., Edinburgh, Scotland). *Postgrad. Med. J.* 53(1626):753-757; 1977.

The case of a patient who developed peripheral mosaic warts and a malignant small bowel lymphoma in association with marked lymphocyte depletion is presented. The patient developed asymmetrical peripheral edema at the age of 12 yr, extensive viral warts at 18 yr, and intestinal lymphangiectasia at 29 yr. The absolute lymphocyte count was 0.8×10^9/l and serum albumin 27 g/l. A low-fat diet and diuretics brought about complete resolution of edema and restoration of the serum albumin to within the normal range. The lymphocyte count remained low and the warts became more extensive on the hands and feet, but the patient remained otherwise asymptomatic until 10 yr later, when he presented with subacute small bowel obstruction. At laparotomy, chylous ascites was found together with gross thickening and hypomotility of the proximal small bowel. A mid-jejunal tumor had narrowed the lumen, and there was a discrete ulcer proximal to it. Obstruction persisted, despite local resection and radiotherapy. Although the patient finally developed extensive abdominal sepsis with bacteremia and died, the warts almost completely disappeared from his hands. The authors propose that the severity of this patient's lymphocyte depletion may account for the appearance of such gross viral warts and ultimately to the complication of small intestinal lymphoma.

6922 RELATIONSHIP BETWEEN 505 PAIRED LIVER TESTS AND BIOPSIES IN 242 OBESE PATIENTS. (Eng.) Galambos, J. T.; Wills, C. E. (Emory Univ. Sch. Medicine, 69 Butler St., S.E., Atlanta, GA 30303). *Gastroenterology* 74(6):1191-1195; 1978.

Studies were carried out in 242 obese patients to determine how reliably biopsy and liver function tests can detect liver pathology. Liver tests were obtained at the time of the liver biopsy on 242 occasions before jejunoileal bypass, on 105 occasions within 18 months, and on 158 occasions beyond 18 months of surgery. The biopsies were obtained as part of routine evaluation of these patients. Therefore, the selection of the patient or the timing of the biopsy did not depend on the results of the liver tests. Five hundred five liver biopsies were compared with liver tests that were obtained at the time of the biopsy. The biopsy abnormalities were lobular (similar to alcoholic) hepatitis, fibrosis, portal hepatitis, and steatosis. The liver tests were SGOT, alkaline phosphatase, bilirubin, and albumin determinations. For the purpose of the analysis, the severity of histological abnormalities were defined. Biochemical abnormalities were arbitrarily defined at two levels. Level 1 was the standard definition of normal-abnormal for our laboratories. Level 2 considered liver tests abnormal only when these deviated more markedly from normal to simulate the common clinical practice that requires similar or greater abnormalities to consider a patient for liver biopsy. The data were then analyzed in two ways: (1) to describe how often the liver tests were abnormal (or normal) when the biopsy was abnormal (the denominator was the liver biopsy), and (2) conversely, how often the lesions were present in liver biopsies when the liver tests were normal or abnormal (the denominator was the liver test). In 60% to 89% of the patients with abnormal liver biopsy, one or more of the liver tests were also abnormal. However, in 9 of 12 comparisons (4 types of lesions in the 3 time periods), the frequency of abnormal biopsies was not higher in those who had abnormal liver tests. The more severe liver test abnormalities (level 2) had a better association with biopsy abnormalities. However, such severe deviations from normal were seen in only about 12% of the abnormal liver biopsies. It appears that the liver function tests do not measure the functional capacity of the liver in quantitative terms and are not sufficiently reliable to identify correctly and consistently the presence of four types of histological lesions, at least in obese patients.

6923 RAPID DEVELOPMENT OF MICRONODULAR CIRRHOSIS FOLLOWING SMALL BOWEL BY-PASS FOR OBESITY: A FORM OF IATROGENIC NUTRITIONAL CIRRHOSIS? (Eng.) Spellberg, M. A.; Bermudez, F. (Michael Reese Hosp. and Medical Center, 2900 S. Ellis Ave., Chicago, IL 60616). *Am. J. Gastroenterol.* 68(4):354-358; 1977.

Progressive fatal liver disease in two nonalcoholic women who underwent small bowel bypass for obesity is reported. The patients died 3 and 8 months after surgery, resp. At autopsy, the morphologic changes were indistinguishable from those seen in alcoholic cirrhosis. Advanced micronodular cirrhosis with extensive fibrosis and necrosis, polymorphonuclear leukocyte infiltration, Mallory bodies, and fatty metamorphosis were present in both cases. It is postulated that the nutritional disturbance, including protein deficiency, and large amounts of fatty acids delivered to the liver from the fat depots, results in fatty metamorphosis, the Mallory bodies, and cirrhosis. Bacterial toxins from the excluded loop of intestine may contribute to this process.

6924 THE EFFECT OF STERCULIA BULK ON THE VISCOSITY OF STOMAL OUTPUT FROM TWELVE PATIENTS WITH ILEOSTOMY. (Eng.) Dalhamn, T.; Graf, W.; Nilsson, L. H. (St. Erik's Hosp., 112 82 Stockholm, Sweden). *Scand. J. Gastroenterol.* 13(4):485-488; 1978.

The effect of a commercial bulk preparation (sterculia bulk) on stomal output, water content, and viscosity was studied in 12 patients with ileostomy. The addition of 15 g of sterculia bulk to the diet daily increased the stomal output, in comparison with a control level, by a mean of 92.6 g ($p<0.01$). Dry weight increased by an average of 14.3 g to 72.2 g/24 hr ($p<0.05$). There was a significant decrease in water content ($p<0.05$). Viscosity of the stomal output increased by about 100% ($p<0.01$). Adding bulk to the diet of ileostomized patients may facilitate the management of the stoma by increasing the viscosity of the output.

6925 HERNIATION THROUGH THE FORAMEN OF WINSLOW: REPORT OF A CASE. (Eng.) Schwarz, H. F. (1777 Hamburg Turnpike, Wayne, NJ 07470). *Dis. Colon Rectum* 20(6):521-523; 1977.

6926 COMBINED INTRINSIC AND EXTRINSIC DUODENAL OBSTRUCTION. (Eng.) Bradic, I.; Letica, C.; Pasini, M. (Sch. Medicine, Univ. Zagreb, Kispaticeva 12, 41000 Zagreb [Rebro], Yugoslavia). *Z. Kinderchir.* 21(4):377-381; 1977.

6927 SURGICAL TREATMENT FOR MORBID OBESITY: INFLUENCE OF AGE ON THE INCIDENCE OF POSTOPERATIVE COMPLICATION. (Eng.) Vicuna-Rios, J. M.; Peringian, L.; Baylis, S. (Pontiac General Hosp., Pontiac, MI). *Abdom. Surg.* 19(9):186-189; 1977.

6928 INTESTINAL BYPASS, OUR EXPERIENCE. (Eng.) Grassi, G.; Cantarelli, I.; Dell'Osso, A.; Orecchia, C.; Grassi, G. B. (Ospedali Riuniti, Rome, Italy). *Chir. Gastroenterol.* 11(2):197-203; 1977.

6929 A COMMUNITY EXPERIENCE WITH THE SURGICAL TREATMENT OF OBESITY. (Eng.) Garrison, R. N.; Waterman, N. G.; Sanders, G. B. (Univ. Louisville Sch. Medicine, Louisville, KY). *Chir. Gastroenterol.* 11(2):205-212; 1977.

6930 THE PRESENT STATUS OF BYPASS OPERATIONS FOR OBESITY. (Eng.) MacLean, L. D.; Shibata, H. R. (Royal Victoria Hosp., Montreal, Quebec, Canada). *Surg. Annu.* 9:213-230; 1977.

6931 SMALL INTESTINAL BYPASS FOR THE TREATMENT OF MORBID OBESITY. (Eng.) Phillips, R. B. (Barnesville Medical Center, Barnesville, OH). *Surg. Gynecol. Obstet.* 146(3):455-468; 1978.

6932 MEDICAL COMPLICATIONS OF INTESTINAL BYPASS SURGERY. (Eng.) Reynolds, T. B. (Univ. Southern California Sch. Medicine, Los Angeles, CA). *Adv. Intern. Med.* 23:47-59; 1978.

6933 AORTODUODENAL FISTULA: AN UNCOMMON BUT CORRECTABLE CAUSE OF UPPER GASTROINTESTINAL BLEEDING. (Eng.) Dean, R. H.; Allen, T. R.; Foster, J. H.; Mattingly, S.; Clayson, K. R.; Edwards, W. H. (Vanderbilt Univ. Sch. Medicine, Nashville, TN 37232). *Am. Surg.* 44(1):37-43; 1978.

6934 VITAMIN B_{12} ABSORPTION FOLLOWING HUMAN INTESTINAL BYPASS SURGERY. (Eng.) Coyle, J. J.; Varco, R. L.; Buchwald, H. (Univ. Minnesota Hosp., Box 290, Minneapolis, MN 55455). *Am. J. Dig. Dis.* 22(12):1069-1071; 1977.

6935 ROENTGENOGRAPHIC FINDINGS IN WORK HYPERTROPHY OF THE MUSCULARIS PROPRIA OF THE TERMINAL ILEUM. (Eng.) Stelling, C. B.; Straus, F. H. (Univ. Virginia Medical Center, Charlottesville, VA 22901). *Am. J. Dig. Dis.* 22(12):1117-1121; 1977.

6936 VILLOUS ADENOMA OF THE DUODENUM: ENDOSCOPIC DIAGNOSIS AND RESECTION. (Eng.) Dupas, J. L.; Marti, R.; Capron, J. P.; Delamarre, J. (Centre Hospitalier Universitaire, Place Victor Pauchet, F-800030 Amiens Cedex, France). *Endoscopy* 9(4):245-247; 1977.

6937 METHYLENE BLUE INJECTION: AN INTRAOPERATIVE GUIDE IN SMALL BOWEL RESECTION FOR ARTERIOVENOUS MALFORMATION. (Eng.) Fogler, R.; Golembe, E. (Brookdale Hosp., Brooklyn, NY). *Arch. Surg.* 113(2):194-195; 1978.

6938 OBSCURE INTUSSUSCEPTION DIAGNOSED BY ULTRASONOGRAPHY. (Eng.) Uhland, H.; Parshley, P. F. (Emanuel Hosp., 2801 N. Gantenbein Ave., Portland, OR 97227). *JAMA* 239(3):224; 1978.

6939 INTESTINAL DUPLICATION DETECTED WITH TECHNETIUM-99m SODIUM PERTECHNETATE IMAGING OF THE ABDOMEN. (Eng.) Barkley, R. M.; Munoz, O.; Parkey, R. W. (Univ. Texas Southwestern Medical Sch., 5323 Harry Hines Blvd., Dallas, TX 75235). *Am. J. Dig. Dis.* 22(12):1122-1126; 1977.

6940 SODIUM BALANCE FOLLOWING SOAVE ILEO-ENDORECTAL PULL-THROUGH. (Eng.) Schwarz, K. B.; Keating, J. P.; Ternberg, J. L.; Bell, M. J.; Howald, M. A. (Washington Univ. Sch. Medicine, St. Louis, MO). *J. Pediatr. Surg.* 12(6):945-953; 1977.

6941 OBSTRUCTION OF THE GASTROINTESTINAL TRACT BY FOREIGN BODIES IN ADULTS. (Eng.) Coughlin, G. P.; Gallery, R.; Hamilton, D. W.; Grant, A. K. (Modbury Hosp., Modbury, South Australia 5092, Australia). *Med. J. Aust.* 2(11):367; 1977.

6942 THE CLINICAL USE OF THE NASO-GASTRIC DUODENAL MERCURY TIP SUMP TUBE IN ABDOMINAL SURGERY AND IN THE MANAGEMENT OF INTESTINAL OBSTRUCTION. (Eng.) Hodge, J. (Spartanburg General Hosp., Spartanburg, SC). *Ann. Surg.* 187(1) 100-102; 1978.

6943 INTESTINAL PNEUMATOSIS--A COMPLICATION OF THE JEJUNOILEAL BYPASS PROCEDURE. (Eng.) Clements, J. L., Jr. (Grady Memorial Hosp--Emory Univ., 80 Butler St., Atlanta, GA 30303). *Gastrointest. Radiol.* 2(3):267-271; 1977.

See also, 6740, 6755, 6756, 6761, 6793, 6835, 6844, 6851, 6869, 6873, 6880, 6887, 6889, 6947, 6948, 6966, 6978, 6990, 7037, 7092, 7199, 7206, 7219, 7220, 7222, 7224, 7232, 7241, 7242, 7243, 7244, 7254, 7255, 7256, 7258, 7259, 7260, 7263, 7266, 7269.

SMALL INTESTINE

Malabsorption

6944 RISK OF COELIAC DISEASE IN CHILDREN OF PATIENTS AND EFFECT OF HLA GENOTYPE. (Eng.) Dennis, N. R.; Stokes, C. R. (Children's Hosp., Buffalo, NY 14222). *J. Med. Genet.* 15(1): 20-22; 1978.

Seventy-three offspring of parents with celiac disease were examined to determine the risk to these children of developing the disease and to what extent this risk is affected by the histocompatibility locus antigen HLA-B. There were 40 index patients who were selected because they had at least one child over the age of 1 yr. In 27 index cases, the symptoms began before the age of 12 yr, while in 13 cases, the onset occurred between 21 and 57 yr. The childhood onset patients themselves had 51 children (aged 1-24 yr), of whom 2 had typical childhood celiac disease and 12 were classified as "suspected." Three of the latter had symptoms of celiac disease, and the other nine were selected because of low height or weight for their age. The 13 adult onset index patients had 22 children (aged 3-40 yr), of whom 1 had childhood celiac disease and 2 were classified as suspected. The parents of all four children with confirmed celiac disease were HLA-B8-positive, but one affected child did not inherit his affected parent's B8 antigen. The findings are consistent with the hypothesis that an allele affecting liability to celiac disease is in linkage disequilibrium with HLA-B8.

6945 ORGAN CULTURE OF COELIAC AND NON-COELIAC SMALL INTESTINAL MUCOSA. (Eng.) Stevens, F. M.; Keane, R.; Fottrell, P. F.; McNicholl, B.; McCarthy, C. F. (Regional Hosp. and Univ. Coll., Galway, Ireland). *Ir. J. Med. Sci.* 147(1):11-14; 1978.

Alterations of enzyme activities were investigated in intestinal biopsies from celiac and non-celiac subjects after 24 hr of maintenance in organ culture. Biopsies from 11 celiac patients and 10 non-celiac patients undergoing gastroenterological investigation were cultured for 24 hr at 37 C, then washed, wrapped in parafilm, and stored at -20 C along with washings and medium to await analysis. At 24 hr of culture, both celiac and non-celiac tissue showed morphological preservation of structure by dissecting microscope and histological examinations, although some areas of necrosis were observed. The protein content of the celiac mucosa decreased by 25-30% during culture ($p<0.02$). Statistically significant changes in enzyme activity were found as an increase in alkaline phosphatase activity (from 12.1 ± 9.5 to 20.1 ± 11.1 IU/

mg protein, $p<0.02$) and a decrease in lactic dehydrogenase activity (from 323.9 ± 154.6 to 235.6 ± 112.7 IU/g protein) in the celiac mucosa. Activities of lactase, sucrase, leucyl β-naphthylamidase, and glucuronidase did not change significantly in either tissue.

6946 FARMER'S LUNG DISEASE AND COELIAC DISEASE: A PROSPECTIVE STUDY. (Eng.) Stevens, F. M.; Hitchcock, H. T. (Regional Hosp., Galway, Ireland). *Ir. J. Med. Sci.* 146(10):335-339; 1977.

To determine if the association noted between celiac disease and diffuse pulmonary disease represents a true genetic relationship, a prospective study of nine consecutive patients with farmer's lung disease (FLD) was carried out. All patients gave the typical history of seasonal dyspnea and cough provoked by exposure to moldy hay. Antibodies to *Micropolyspora faeni* were found in eight patients. Histocompatibility locus antigen B8 was present in only four patients. All small intestinal biopsies of the FLD patients showed the presence of finger and leaf villi, and none showed the convoluted or mosaic appearance characteristic of untreated celiac disease. The alkaline phosphatase activity was significantly higher in the FLD patients than in nine controls ($p<0.05$). There was no significant difference in lactase activity or intraepithelial lymphocytes between the patients and controls. The results of this preliminary investigation do not support the hypothesis of an association between celiac disease and FLD.

6947 PNEUMATOSIS CYSTOIDES INTESTINALIS AND OBSTRUCTING INTUSSUSCEPTION IN CELIAC DISEASE. (Eng.) Frank, P. H.; O'Connell, D. J. (Dept. Radiology, Univ. Chicago, 950 E. 59th St., Chicago, IL 60637). *Gastrointest. Radiol.* 2(2): 109-111; 1977.

The case of a patient with celiac disease complicated by pneumatosis cystoides intestinalis (PCI) of the small intestine and obstructing intussusception is presented. The patient, a 48-yr-old woman known to have steroid-controlled celiac disease, presented with abdominal pain and distention. A chest radiograph showed free air under the right diaphragm, and a barium examination revealed a diffuse abnormality consisting of nonpliable jejunal loops with complete loss of the normal fold pattern and thickening of the bowel wall. There was PCI in several ileal loops. The pneumoperitoneum was thought to be secondary to the PCI. Five days later the patient experienced acute abdominal pain; a diagnosis of an ileocolic intussusception was made on the basis of a plain abdominal radiograph and confirmed at laparotomy. Extensive pneumatosis intestinalis was found in the distal jejunum and in the distal 5 feet of the ileum, and the portion of the ileum containing the intramural gas was involved in the intussusception. The authors believe that the patient's documented celiac disease was the cause of the small intestinal PCI. As polypoid gastrointestinal lesions are well known for their association with intussusception, the small intestinal gas cysts are thought to be the cause of the obstructing ileocolic intussusception.

6948 CELIAC DISEASE WITH JEJUNAL ULCERATION. (Eng.) Agrawal, R. M.; Benz, W.; Brodmerkel, G. J., Jr.; Cincala, R. P. (Allegheny General Hosp., 320 E. North Ave., Pittsburgh, PA 15212). *Am. J. Gastroenterol.* 68(3):300-303; 1977.

The case of a patient with jejunal ulceration complicating celiac disease is presented. The patient first experienced weight loss, periumbilical pain, nausea, and occasional vomiting at the age of 39. She remained essentially asymptomatic for the next 5 yr. When she again developed persistent crampy periumbilical pain, a review of an upper gastrointestinal series revealed small serrations in the duodenal walls in addition to some edematous changes in the mucosa. The lumen of the proximal jejunum appeared narrowed. These findings were confirmed by a repeat upper gastrointestinal series. Endoscopy showed esophagitis, diffuse gastritis, marked diffuse nodularity in the duodenum, and duodenitis. At this time, a biopsy showed flat mucosa with complete absence of villi. At surgery, one small ulcer was found in a resected segment of jejunum. The patient responded to a gluten-free diet, but died 18 months later; a lymph node biopsy had shown lymphosarcoma.

6949 SUCROSE MALABSORPTION IN MAN AFTER INGESTION OF α-GLUCOSIDE-HYDROLASE INHIBITOR. (Eng.) Caspary, W. F. (Dept. Medicine, Univ. Gottingen, W. Germany). *Lancet* 1(8076):1231-1233; 1978.

The effect of an α-glucosidehydrolase inhibitor (α-GHI) on intestinal sucrose absorption was assessed in seven healthy subjects by measuring rises in blood glucose and intestinal hydrogen production after the ingestion of 100 g sucrose. α-GHI (200 mg), given with the sucrose, completely inhibited early postprandial blood glucose rises, prevented late postprandial dips in blood glucose, and considerably increased breath hydrogen levels (the 30-min postprandial rise in blood glucose in each subject increased by over 30 ppm over baseline), which indicates sucrose malabsorption. Thus, the inhibitor can be used to study carbohydrate malabsorption and may be useful as a method for retarding carbohydrate absorption.

6950 DOUBLE BLIND STUDY OF MILK LACTOSE INTOLERANCE. (Eng.) Lisker, R.; Aguilar, L. (Istituto Nacional de la Nutricion, San Fernando y Viaducto, Tlalpan, Mexico 22). *Gastroenterology* 74(6):1283-1285; 1978.

A double-blind study was carried out in 150 subjects to determine the relationship between lactose malabsorption and milk lactose intolerance. Each participant received 250 ml of a different type of milk on three consecutive days. Milk A contained no lac-

tose, milk B had 12.5 g, and milk C contained 37.5 g of lactose. After the experiment was completed, each subject was classified with a lactose tolerance test as having "sufficient" or "insufficient" lactase activity. Milk A produced no gastrointestinal symptoms in either sufficient or in insufficient persons. Milk B produced symptoms in 3.8% of sufficient and 37.1% of insufficient individuals, and milk C induced symptoms in 7.6% of sufficient and 83.5% of insufficient subjects. These differences are very highly significant ($p<0.0001$). It is concluded that lactose-intolerant subjects are indeed milk-intolerant and that the frequency with which symptoms occur in persons with lactose malabsorption increases in direct relation to the lactose content of the milk.

6951 IS JEJUNAL BIOPSY REALLY NECESSARY IN COW'S MILK PROTEIN INTOLERANCE? (Eng.) Sumithran, E.; Iyngkaran, N. (Medical Faculty, Univ. Malaya, Kuala Lumpur, Malaysia). *Lancet* 2(8048):1122-1123; 1977.

6952 FAMILY STUDIES OF LACTASE DEFICIENCY IN THE AMERICAN INDIAN. (Eng.) Newcomer, A. D.; Gordon, H.; Thomas, P. J.; McGill, D. B. (Mayo Clinic, Rochester, MN 55901). *Gastroenterology* 73(5):985-988; 1977.

6953 SELECTIVE EFFECTS OF THIAZIDE ON INTESTINAL ABSORPTION OF CALCIUM ON ABSORPTIVE AND RENAL HYPERCALCIURIAS. (Eng.) Barilla, D. E.; Tolentino, R.; Kaplan, R. A.; Pak, C. Y. C. (Univ. Texas Health Science Center at Dallas, 5323 Harry Hines Blvd., Dallas, TX 75235). *Metabolism* 27(2):125-131; 1978.

6954 MULTIFACTORIAL MEGALOBLASTIC ANAEMIA. (Eng.) Hift, W.; Moshal, M. G. (Dept. Medicine, Univ. Natal, Durban, South Africa). *South Afr. Med. J.* 53(8):275-282; 1978.

6955 COELIAC DISEASE AND IMMUNOLOGICAL DISORDERS. (Eng.) Cooper, B. T.; Holmes, G. K. T.; Cooke, W. T. (General Hosp., Birmingham B4 6NH, England). *Br. Med. J.* 1(6112): 537-539; 1978.

6956 COW'S MILK INTOLERANCE PRESENTING AS NECROTIZING ENTEROCOLITIS. (Eng.) De Peyer, E.; Walker-Smith, J. (Hopital Cantonal, CH-1211 Geneve 4, Switzerland). *Helv. Paediatr. Acta* 32(6):509-515; 1977.

6957 DISACCHARIDASE DEFICIENCY IN INFANTS WITH COW'S MILK PROTEIN INTOLERANCE: RESPONSE TO TREATMENT. (Eng.) Poley, J. R.; Bhatia, M.; Welsh, J. D. (Zentrum fur Innere Medizin, Kinderheilkunde und Dermatologie, Prittwitzstrasse 43, D-7900 Ulm, W. Germany). *Digestion* 17(2):97-107; 1978.

6958 IMMUNOLOGICAL STUDIES OF EOSINOPHILIC GASTRO-ENTERITIS AND TREATMENT WITH DISODIUM CROMOGLYCATE AND BECLOMETHASONE DIPROPIONATE. (Eng.) Elkon, K. B.; Sher, R.; Seftel, H. C. (Univ. Witwatersrand Medical Sch., Hospital St., Johannesburg 2001, South Africa). *S. Afr. Med. J.* 52(21):838-841; 1977.

See also, 6796, 6934, 6978, 7229, 7235.

LARGE INTESTINE

6959 PROCTITIS AND ISCHEMIC COLITIS. (Fre.) De Witte, C.; Serste, J. P.; Dony, A. (Hopital de Schaerbeek, Boulevard Lambermont 220, 1030 Bruxelles, Belgium). *J. Belge Radiol.* 60(1): 113-116; 1977.

Two new cases of ischemic proctitis and colitis due to a vascular pathology (probably of the arterioles) near the inferior mesenteric artery are presented. The first patient (an 82-yr-old man) was admitted in cardiogenic shock with occlusive symptoms. Barium enema revealed typical lesions with "thumb print" marginal deformations of the upper descending colon. The lesions rapidly became diffuse and ulcerative, and the patient died on day 8 of a massive myocardial infarction. The second patient (an 89-yr-old woman) was seen for acute, massive rectal hemorrhage. Examination revealed ischemic lesions limited to the rectum, a rare location. The patient was treated with transfusions; the bleeding stopped and her condition improved. On day 30, rectoscopy showed a scarred, congested mucosa with a cicatricial stenosis at 10 cm of the anal margin. These ischemic lesions occur in old people or those with vascular deficiencies, although they have been reported in

young women taking oral contraceptives. The radiographic image is characteristic: thickening of mucosal folds and the above thumb print deformations. A strict radiographic and endoscopic surveillance is always necessary, since the evolution of the lesions cannot be predicted by their original appearance. Any increase in abdominal pain, fever, or leukocytosis suggests an aggravation of the condition and necessitates an exploratory laparotomy.

6960 SPONTANEOUS RESOLUTION OF COLONIC STRICTURES CAUSED BY NECROTIZING ENTEROCOLITIS: THERAPEUTIC IMPLICATIONS. (Eng.) Tonkin, I. L. D.; Bjelland, J. C.; Hunter, T. B.; Capp, M. P.; Firor, H.; Ermocilla, R. (Univ. Arizona Health Sciences Center, Tucson, AZ 85724). *Am. J. Roentgenol.* 130(6):1077-1081; 1978.

The clinical course of seven infants with colonic strictures after surviving necrotizing enterocolitis is described. Only two demonstrated the finding of fixed fibrotic stricture described in the literature, while the remaining five showed atypical radiographic and pathologic features. Two of the five showed partial or spontaneous resolution of postnecrotizing enterocolitis colonic stenoses on follow-up barium enema studies. In three of four patients with colonic resections, the histopathologic examination revealed a surprising absence of irreversible fibrosis or cicatrix formation. Current surgical practice dictates elective resection of these narrowed colonic segments. The radiologic and pathologic findings in this series of patients suggest that surgical resection may be unnecessary in selected cases.

6961 GIANT SIGMOID DIVERTICULUM: CLINICAL AND RADIOLOGICAL FEATURES. (Eng.) Foster, D. R.; Ross, B. (Royal Hosp., Sheffield, England). *Gut* 18(12):1051-1053; 1977.

Two case reports of giant sigmoid diverticulum associated with diverticular disease of the sigmoid colon are presented. The patients, a 61-yr-old woman and an 86-yr-old man, presented with abdominal pain of several weeks' duration, and the man had rectal bleeding. Abdominal films in the first patient showed a large gas-filled cyst occupying the greater part of the abdomen and containing a fluid level. The lesion measured 29 cm in diameter. At laparotomy, the cyst was found to be adherent anteriorly to the uterus and bladder. Barium meal examination in the second patient showed a large gas-filled structure lying in the epigastrium and displacing the stomach. A barium enema examination showed diverticular disease of the sigmoid colon with a large solitary diverticulum arising from its superior margin. A defunctioning colostomy was carried out in the first patient and a sigmoid colectomy with an end-to-end anastomosis in the second. Pathological examination of the resected specimens revealed communication with the sigmoid colon in the second patient but not in the first. The radiological finding of a large lucent cystic structure related to the sigmoid colon in an elderly patient is suggestive of a giant sigmoid diverticulum. This suggestion was confirmed by barium enema examination, and the treatment of choice is surgical removal.

6962 IS THERE A MYOELECTRICAL ABNORMALITY IN THE IRRITABLE COLON SYNDROME? (Eng.) Taylor, I.; Darby, C.; Hammond, P.; Basu, P. (Dept. Surgery, Univ. Liverpool, Liverpool, England). *Gut* 19(5):391-395; 1978.

The colonic myoelectrical pattern of 10 patients with the irritable colon syndrome and who had an abnormality of the 0.05 Hz [3 cycles/min (c/m)] slow wave electrical activity of the distal colon was compared with that in 10 patients with assorted disorders with similar symptoms (e.g., chronic pancreatitis, diverticular disease, and ulcerative colitis) to determine whether this abnormality is related to small bowel habit alone or whether it is specific to the irritable colon syndrome. Transit time, stool weights, percentage motility, and slow wave electrical activity were measured in each patient. The two groups were matched for age, and patients with similar symptoms in the two groups had similar values for transit time and percentage motility. There was a statistically significant increase in the 3 c/m electrical activity in patients with the irritable colon syndrome unrelated to the degree of diarrhea or constipation (43.9 ± 15.8% in patients with constipation and 51.1 ± 4.7% in patients with diarrhea in the irritable colon group, versus 13.2 ± 6.8% and 9.2 ± 3.7%, resp., in the patients without irritable colon). It appears that the abnormally high incidence of 3 c/m electrical activity in the colon is specific to the irritable colon syndrome and not merely a feature of altered bowel habit.

6963 INTESTINAL POLYPOSIS: A GENETIC DISEASE. (Fre.) Plauchu, H.; Bigay, D.; Casteu, J. G.; Guillemin, G.; Robert, J. M. (Service de Genetique, Hotel Dieu, F 69288 Lyon Cedex 1, France). *Lyon Med.* 239(1):21-30; 1978.

A study of 32 patients with intestinal polyposis and their 22 families confirmed that the disease is transmitted by an autosomal dominant gene with incomplete penetrance and variable expressivity. A detailed study of eight families, including complete family histories and barium enemas of all the family members, demonstrates the wide variability in the onset and course of the disease. Some family members showed symptoms at age 2, while others remained healthy until 60 yr; there is a similar wide age range at which the polyps became cancerous (age 20-65). The association of Gardner's syndrome (osteomas and epidermoid tumors) and Turcot's syndrome (nervous tissue tumors) with rectocolic polyposis in one family suggests the identical genetic transmission of all three diseases. The authors stress the need of regular checkups (especially double-contrast barium enemas) for all family members of patients with familial rectocolic polyposis. Any

relatives found to have polyposis should immediately undergo a prophylactic colectomy. The conservation of the rectum will depend on whether all rectal polyps can be removed, the willingness of the patient to submit to life-long surveillance, removal of new polyps, and, of course, the presence of degenerated polpys in the rectum itself. Tracking down and examining all family members for intestinal polyposis is recommended.

6964 CARCINOMA IN SITU OF THE DISTAL PART OF THE COLON AND OF THE RECTUM. (Eng.) Rittenhouse, M. C.; Copeland, E. M., III. (M. D. Anderson Hosp. Tumor Inst., Houston, TX). *Surg. Gynecol. Obstet.* 146(2):225-229; 1978.

The cases of 103 patients with carcinoma *in situ* of the rectum, rectosigmoid, and sigmoid colon diagnosed between 1944 and 1974 were evaluated retrospectively. In 42 patients, carcinoma *in situ* was unassociated with other malignant disease or medical illness; 43 had synchronous invasive carcinoma of the colon; 7 had a history of invasive carcinoma of the colon; and 9 had an associated cancer not involving the colon. The majority of lesions occurred within an adenomatous polyp. Among the 42 patients with carcinoma *in situ* alone, one-third were asymptomatic, 18 had bleeding, and 5 each had a change in intestinal habits or abdominal pain. The diagnosis was made by sigmoidoscopy in 34 patients, by operation in 7, and by colonoscopy in 1. Adequate excision, either locally or by colonic resection, was all that was required in these patients; however, two developed metachronus carcinoma of the colon and one later had a solitary metastasis to the liver, indicating that these patients should be observed indefinitely by frequent barium enemas and sigmoidoscopy. Of the 43 patients with carcinoma *in situ* and synchronous invasive colon carcinoma, only 12% were asymptomatic, and 38% had more than one symptom. Carcinoma *in situ* was diagnosed either by sigmoidoscopic biopsy (58%) or by examination of the resected surgical specimen (42%). Prognosis and treatment were determined by the nature of the invasive lesion, and colonic resection was performed in 85% of these patients. At the most recent follow-up, 11 were alive without evidence of disease, 1 was alive with metastasis, 11 were dead of other causes, and 20 were dead of metastatic carcinoma of the colon (only 3 of these survived for $\geq$5 yr after treatment). Of the seven patients with a history of carcinoma, the time elapsing between treatment of the prior carcinoma and the diagnosis of carcinoma *in situ* was <3 yr in four patients and <10 yr in all patients. All seven survived at least 5 yr and two developed a third carcinoma of the colon. In the nine patients with other carcinomas (lung in 3; breast, nasopharynx, cervix, and kidney in 1 each; stomach in 2), the invasive malignant disease determined the prognosis, and all were dead within 5 yr of the diagnosis of carcinoma *in situ* of the colon.

6965 LEIOMYOSARCOMA OF THE ANUS: REPORT OF A CASE. (Eng.) Wolfson, P.; Ota, C. (Mount Sinai Sch. Medicine, City Univ. New York, Fifth Ave. at 100th St., New York, NY 10029). *Dis. Colon Rectum* 20(7):600-602; 1977.

6966 THE VALUE OF GASTROGRAFIN IN THE DIFFERENTIAL DIAGNOSIS OF PARALYTIC ILEUS VERSUS MECHANICAL INTESTINAL OBSTRUCTION: A CRITICAL REVIEW AND REPORT OF TWO CASES. (Eng.) Zer, M.; Kaznelson, D.; Feigenberg, Z.; Dintsman, M. (Beilinson Hosp., Petah Tiqva, Israel). *Dis. Colon Rectum* 20(7):573-579; 1977.

6967 THE STUDY OF ANORECTAL DISEASE BY COLPOSCOPY. (Eng.) O'Connor, J. J. (Columbia Hosp. Women, Washington, DC). *Dis. Colon Rectum* 20 (7):570-572; 1977.

6968 ULCERATIVE PROCTITIS WITH STRICTURE TREATED WITH HYDROCORTISONE INJECTIONS: REPORT OF A CASE. (Eng.) Nelson, R. S. (Univ. Texas System Cancer Center, Houston, TX 77030). *Dis. Colon Rectum* 20(6):515-516; 1977.

6969 RETRORECTAL ABSCESS WITH NEUROLOGIC INVOLVEMENT OF THE LOWER EXTREMITIES: REPORT OF A CASE. (Eng.) Shub, H. A.; Friedman, I. (Beth Israel Medical Center, New York, NY). *Dis. Colon Rectum* 20(6):528-531; 1977.

6970 MALIGNANT APPENDICEAL CARCINOID WITH INTUSSUSCEPTION OF THE BASE MANIFESTING AS A CECAL TUMOR: REPORT OF A CASE. (Eng.) Skaane, P.; Eide, T. J. (Harstad Sykehus, 9400 Harstad, Norway). *Dis. Colon Rectum* 20(6):511-514; 1977.

6971 STERCORACEOUS ULCERATIONS AND PERFORATIONS OF THE COLON: REPORT OF CASES AND SURVEY OF THE LITERATURE. (Eng.) Shatila, A. H.; Ackerman, N. B. (Cleveland Metropolitan General Hosp., Case Western Reserve Univ., Cleveland, OH). *Dis. Colon Rectum* 20(6):524-527; 1977.

6972 CARDIAC DISEASE AND RECURRENT GASTROINTESTINAL BLEEDING: ANGIODYSPLASIA WITH ACCOMPANYING HYPERTROPHIC SUBAORTIC STENOSIS. (Eng.) Kimmel, D. J.; Paster, S. B.; Burstein, J.; Stovring, J.; Cochran, P. T. (Bernalillo County Medical Center, Albuquerque, NM). *Rocky Mt. Med. J.* 74(6):316-318; 1977.

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6992 ACUTE APPENDICITIS IN A CHILD ASSOCIATED WITH PROLONGED APPENDICEAL RETENTION OF BARIUM (BARIUM APPENDICITIS). (Eng.) Merten, D. F.; Lebowitz, M. E. (Duke Univ. Medical Center, P.O. Box 3808, Durham, NC 27710). *South. Med. J.* 71(1):81-82; 1978.

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7010 SIGMOID VOLVULUS IN THE YOUNG: A CASE FOLLOWING CESAREAN SECTION. (Eng.) Fuller, J. K.; Larrieu, A. J. (Univ. Texas Medical Branch, Galveston, TX 77550). *Arch. Surg.* 113(3):316-317; 1978.

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7012 TRANSVERSE COLON IN ADULT UMBILICAL HERNIA. (Eng.) Forrest, J. V.; Stanley, R. J. (Dept. Radiology, Univ. California, 3350 La Jolla Village Drive, San Diego, CA 92161). *Am. J. Roentgenol.* 130(1):57-59; 1978.

7013 DIAGNOSIS AND TREATMENT OF INTRA-ABDOMINAL ABSCESSES AFTER APPENDECTOMY. (Rus.)

Guzeev, A. I. (Novgorod Municipal Hosp., Novgorod, USSR). *Vestn. Khir.* 120(2):50-53; 1978.

7014 LONG-TERM RESULTS OF SURGICAL TREATMENT OF ACUTE COMMISSURAL ILEUS. (Rus.) Toropov, Iu. D. (Zaporozhe Inst. Advanced Training Physicians, Zaporozhe, USSR). *Khirurgiia (Mosk.)* (3):55-59; 1978.

7015 EARLY COMMISSURAL ILEUS AFTER APPENDECTOMY. (Rus.) Kovalev, M. M.; Roi, V. P.; Burka, A. A.; Babenkov, G. D.; Gunchenko, A. N. (Surgical Clinic, Kiev Medical Inst., Kiev, USSR). *Khirurgiia (Mosk.)* (3):59-63; 1978.

7016 THE CAUSES OF ACUTE COMMISSURAL ILEUS. (Rus.) Udod, V. M.; Grinberg, S. B.; Kotiger, Ya. S.; Andrun, P. K. (General Surgery Clinic, Tselinograd Medical Inst., Tselinograd, USSR). *Khirurgiia (Mosk.)* (3):63-66; 1978.

See also, 6739, 6761, 6764, 6771, 6776, 6783, 6793, 6802, 6858, 6886, 6932, 6938, 6940, 7018, 7020, 7027, 7220, 7222, 7223, 7232, 7241, 7242, 7243, 7244, 7254, 7255, 7256, 7257, 7258, 7259, 7260, 7268.

LARGE INTESTINE

Ulcerative Colitis

7017 MENTAL DISORDERS IN ULCERATIVE COLITIS: SUICIDE, DIVORCE, PSYCHOSIS, HOSPITALIZATION FOR MENTAL DISEASE, ALCOHOLISM, AND CONSUMPTION OF PSYCHOTROPIC DRUGS IN 178 PATIENTS SUBJECTED TO COLECTOMY. (Eng.) Gruner, O. P. N.; Naas, R.; Gjone, E.; Flatmark, A.; Fretheim, B. (Rikshospitalet, Oslo 1, Norway). *Dis. Colon Rectum* 21(1):37-39; 1978.

The incidence of mental disorders, divorce, alcoholism, and consumption of psychotropic drugs in 178 patients who underwent colectomy for the treatment of ulcerative colitis was compared with that in the general Norwegian population. The frequencies of suicide, divorce, psychosis, hospitalization for mental disorders, and consumption of psychotropic drugs did not differ significantly from corresponding frequencies in the general population.

7018 CLINICAL OUTCOME OF THE FIRST TEN YEARS OF ULCERATIVE COLITIS AND PROCTITIS. (Eng.) Ritchie, J. K.; Powell-Tuck, J.; Lennard-Jones, J. E. (St. Mark's Hosp., City Rd., London EC1V 2PS, England). *Lancet* 1(8074):1140-1143; 1978.

Two hundred sixty-nine patients with ulcerative colitis and a history of less than 6 months when first seen at St. Mark's Hospital in the decade 1966-75 were followed for up to 11 yr in a study of the mortality and prognosis of this disease. The outcome was correlated with the maximum extent of the disease observed within 3 months of presentation. Seventy-five patients required hospital admission, 56 within 1 yr of presentation. Extensive colitis developed in 60 patients. The cumulative probability of the disease being extensive was 21 ± 3% at 5 yr and 29 ± 4% at 10 yr. Twenty-five patients required surgical treatment. The cumulative probability of operation was 8 ± 2% at 5 yr and 15 ± 4% at 10 yr. Nineteen patients are known to have died. The expected number of deaths was 19.2.

7019 STROKES AND ULCERATIVE COLITIS. (Eng.) Mayeux, R.; Fahn, S. (Presbyterian Hosp., New York, NY). *Neurology* 28(6):571-574; 1978.

The cases of three young patients who had ulcerative colitis and cerebral thrombosis are presented. The first two patients, a 12-yr-old boy and a 17-yr-old girl, experienced more than one episode of thromboembolic disease. The boy first developed left focal motor seizures during treatment for an exacerbation of colitis. The seizures were controlled with anticonvulsants, but a dense left hemiparesis persisted. This condition slowly improved, but he had two subsequent episodes of thrombophlebitis of the right leg. The girl developed a sudden loss of vision in the left eye during treatment for an exacerbation of colitis. The optic disk was pale, and there were small hemorrhages in the periphery, compatible with central retinal artery occlusion. She developed left focal motor seizures, left homonymous hemianopia, and left hemiparesis. Except for nonspecific arthralgia and atopic eczema in this patient, neither of the patients had evidence of any other extracolonic manifestation of ulcerative colitis. Clinical and laboratory data indicated arterial occlusion in these two cases. The third case was a 26-yr-old woman who developed right

focal motor seizures 50 hr after undergoing a total proctocolectomy. Following the seizures, there was fluent aphasia and right hemiparesis. All patients survived, and the neurologic symptoms gradually improved. Systemic arterial and venous thromboembolic complications occur often in ulcerative colitis, but stroke is uncommon. Abnormalities in the early stages of clotting may be responsible, and the risk of thromboembolic phenomena in young patients seems to increase with exacerbations of this form of chronic inflammatory bowel disease.

7020 PREDICTION OF MALIGNANCY IN ULCERATIVE COLITIS [Abstract]. (Eng.) Nugent, F. W.; Haggitt, R. C.; Colcher, H.; Kutteruf, G. C. (Lahey Clinic Foundation, Boston, MA). *Gastroenterology* 72(5, Part 2):1108; 1977.

7021 ASSESSMENT OF SACRO-ILIITIS IN PATIENTS WITH INFLAMMATORY BOWEL DISEASE (IBD) [Abstract]. (Eng.) Davis, P.; Thomson, A. B. R. (Univ. Alberta, Edmonton, Alberta, Canada). *Gastroenterology* 72(5, Part 2):1045; 1977.

7022 THE SPECTRUM OF ANKYLOSING SPONDYLITIS IN PATIENTS WITH INFLAMMATORY BOWEL DISEASE--CLINICAL AND GENETIC STUDIES [Abstract]. (Eng.) Dekker-Saeys, B. J.; Meuwissen, S. G. M.; van den Berg-Loonen, E. M.; Tytgat, G. N. J. (Amsterdam Center Rheumatic Diseases, Univ. Amsterdam, Amsterdam, Netherlands). *Gastroenterology* 72(5, Part 2): 1047; 1977.

7023 EXPERIMENT TO DETERMINE THE ACTIVE THERAPEUTIC MOIETY OF SULPHASALAZINE [Abstract]. (Eng.) Khan, A. K. A.; Piris, J.; Truelove, S. C. (Radcliffe Infirmary, Oxford, England). *Gut* 18(11): A971; 1977.

7024 DIAGNOSIS AND THERAPY OF ZINC DEFICIENCY DURING TOTAL PARENTERAL FEEDING. A REVIEW AND CASE REPORT. (Ger.) Weismann, K.; Wanscher, B.; Knudsen, L. (Rigshospital, Dermatologische Abteilung, Blegdamsvej 9, DK-2100 Copenhagen, Denmark). *Hautarzt* 28(11):578-582; 1977.

7025 LIVER INVOLVEMENT IN INFLAMMATORY BOWEL DISEASE. (Eng.) Bayless, T. M.; Boitnott, J. K. (Johns Hopkins Univ. Medical Sch., Baltimore, MD). *Johns Hopkins Med. J.* 141(4):226-232; 1977.

7026 SULPHASALAZINE-INDUCED LUPUS SYNDROME IN ULCERATIVE COLITIS. (Eng.) Griffiths, I. D.; Kane, S. P. (Charing Cross Hosp., London W6, England). *Br. Med. J.* 2(6096):1188-1189; 1977.

7027 SURGICAL ASPECTS OF ULCERATIVE COLITIS AND CROHN'S DISEASE OF THE LARGE BOWEL. (Eng.) Goligher, J. C. (General Infirmary, Leeds, England). *Adv. Surg.* 11:71-99; 1977.

7028 CURRENT STATUS OF THE PRECANCER LESION IN ULCERATIVE COLITIS. (Eng.) Dobbins, W. O., III (George Washington Univ. Medical Center, H. B. Burns Memorial Building, 2150 Pennsylvania Ave., N.W., Washington, DC 20037). *Gastroenterology* 73(6):1431-1433; 1977.

See also, 6978, 6979, 7262.

PANCREAS

7029 EFFECT OF SALIVA FROM CYSTIC FIBROSIS PATIENTS AND FROM NORMAL SUBJECTS ON RED BLOOD CELL SODIUM TRANSPORT. (Eng.) Grinwald, P. M.; Segal, M. B. (St. Thomas' Hosp. Medical Sch., Lambeth Palace Rd., London, SE1 7EH, England). *Pediatr. Res.* 12(1):1-3; 1978.

To determine whether saliva contains substances that may be relevant to the transport abnormality in cystic fibrosis, the effect of saliva from cystic fibrosis patients on RBC sodium transport was compared with that from normal subjects. RBC from cystic fibrosis patients exhibited a significantly decreased ($p<0.01$) ouabain-insensitive fraction of Na^+ efflux compared with normal controls. Saliva taken from both the patients and the normal subjects caused an increase in Na^+ efflux from normal RBC, either in presence or absence of ouabain (0.1 mM), of 19% to 29% as compared with untreated control RBC. There was no significant difference between the effects of cystic fibrosis saliva and normal saliva. The model in this study has not confirmed that a modification of the cell membrane by uncharacterized circulating or secreted factors may be involved in the transport abnormality in cystic fibrosis.

7030 PANCREATIC PSEUDOCYSTS: UNUSUAL ULTRASOUND FEATURES. (Eng.) Conrad, M. R.; Landay, M. J.; Khoury, M. (Parkland Memorial Hosp.,

5201 Harry Hines Blvd., Dallas, TX 75235). *Am. J. Roentgenol.* 130(2):265-268; 1978.

Three cases of pancreatic pseudocyst having unusual findings on the sonogram are presented. All patients were alcoholics. In one patient, the renal parenchyma was markedly compressed between the anterior and posterior components of the perinephric pseudocyst so that an intrinsic renal mass was mimicked on the excretory urogram. The correct diagnosis was made by the determination of the amylase in the aspirated fluid. In the second case, sonography revealed a large cystic mass in the left upper quadrant contiguous with and displacing the spleen medially. The lateral location of the cystic mass and the lack of a continuous distinct interface between the cystic mass and the spleen resulted in confusion with a splenic subcapsular hematoma. The large necrotic pseudocyst was discovered at surgery. The phlegmenous inflammatory reaction associated with it probably was responsible for obscuring the interface between the pseudocyst and the spleen. In the third patient, the sonographic findings were indistinguishable from those seen in a perinephric abscess. However, the patient's good renal function and a well-defined renal margin on the excretory urogram suggested that this diagnosis was unlikely. The elevated amylase in the purulent aspirated fluid established a definitive diagnosis of an infected dissecting pseudocyst, of which only the small posterior perinephric portion was appreciated on the sonogram. Pancreatic pseudocysts must be considered in all patients with a history of chronic alcoholism who have evidence of an abnormal cystic collection by sonography.

7031 LABORATORY DIAGNOSIS OF CHRONIC PANCREATIC DISEASES. (Ita.) Robba, L.; Levoni, P. (Ospedali Riuniti di Bergamo, Bergamo, Italy). *Minerva Med.* 68(30):2077-2084; 1977.

7032 EXPERIENCE WITH THE USE OF BILE DUCT PROSTHESIS. (Ger.) Hartenbach, W. (Stadtische Chirurgische Klinik, Schwalbacher Strasse 62, D-6200 Wiesbaden, W. Germany). *Chirurg* 48(8):549-552; 1977.

7033 PRACTICAL APPLICATION OF EXTERNAL DRAINAGE OF THE PANCREATIC DUCT. (Rus.) Napalkov, P. N.; Artem'eva, N. N. (Surgical Clinic, Leningrad Inst. Hygiene and Medicine, Leningrad, USSR). *Vestn. Khir.* 118(2):3-8; 1977.

7034 SEPTIC COMPLICATIONS IN PANCREATIC SURGERY. (Ger.) Neher, M.; Mangold, G.; Ruckert, K.; Kummerle, F. (Chirurgische Universitatsklinik, Langenbeckstrasse 1, 6500 Mainz, W. Germany). *Therapiewoche* 27(47):8467-8475, *passim;* 1977.

7035 LESION OF THE TAIL OF THE PANCREAS IN CONGENITAL APLASIA OF THE LEFT CUPULA OF THE DIAPHRAGM. (Rus.) Kriviakin, K. D.; Zhdanov, A. I. (Volokolamsk Central Regional Hosp., Volokolamsk, Moscow Oblast, USSR). *Khirurgiia (Mosk.)* (1):115-116; 1978.

7036 COMPARISON OF PANCREATIC CARCINOMA WITH CHRONIC PANCREATITIS BY SERUM GLYCOPROTEIN. (Jpn.) Noda, T.; Ishii, K.; Tsuchiya, R.; Ito, T.; Kondo, N.; Saheki, S. (Nagasaki Univ. Sch. Medicine, Nagasaki, Japan). *Jpn. J. Cancer Clin.* 23(8):831-835, A-42; 1977.

7037 LATE METASTASIS OF HYPERNEPHROMA TO THE PANCREAS WITH TUMOR INVASION OF THE DUODENUM. (Ger.) Hermanutz, K. D.; Sonnenberg, G. E. (Radiologische Klinik, Universitat Bonn, Wilhelmstrasse 35-37, 5300 Bonn, W. Germany). *Fortschr. Geb. Roentgenstr. Nuklearmed.* 127(6):595-597; 1977.

See also, 6749, 6766, 6772, 6773, 6774, 6775, 6776, 6777, 6784, 6785, 6794, 6796, 6797, 6798, 6801, 6804, 6807, 6942, 7039, 7058, 7064, 7168, 7175, 7176, 7205, 7217, 7224.

PANCREAS

Pancreatitis

7038 ELEVATED SERUM ALKALINE PHOSPHATASE LEVEL MAY AID IN THE DIAGNOSIS OF PANCREATITIS. (Eng.) Hislop, I. G.; Ryan, G. P. (Fremantle Hosp., Adelaide, Australia). *Med. J. Aust.* 2(7):209-211; 1977.

The occurrence of an elevated serum alkaline phosphatase (SAP) level in some patients with pancreatitis was studied in 10 patients. Seven patients had alcoholic pancreatitis, whereas the remaining three drank little or no alcohol. The SAP levels were intermittently and variably raised. There was usually a close relationship between pain and a rise in the SAP levels, but other laboratory investigations often failed to support a diagnosis of pancreatitis, the serum and urinary amylase levels being normal or minimally raised. However, when the SAP level exceeded twice normal values,

serum or urinary amylase values generally indicated a clinical diagnosis of pancreatitis. To exclude coexisting hepatic disease, liver function was assessed in all cases. The bilirubin levels were normal in all cases, and the aspartate transaminase levels were only mildly elevated in two patients (148 U and 111 U, resp.). SAP estimation may assist in establishing a clinical diagnosis in cases of abdominal pain in which pancreatitis is suspected.

7039 THE CEA CONCENTRATION IN DUODENAL FLUID IN PATIENTS WITH PANCREATIC DISEASE. (Eng.) Rolny, P.; Elwing, H.; Nilsson, L. A. (Dept. Surgery III, Univ. Goteborg, Goteborg, Sweden). *Scand. J. Gastroenterol.* 12(6):759-763; 1977.

Six patients with pancreatic carcinoma, 10 patients with chronic alcoholic pancreatitis, 10 patients with other upper abdominal nonpancreatic diseases, and 10 healthy volunteers were studied to establish whether carcinoembryonic antigen (CEA) determination in duodenal fluid obtained during the secretin-cholecystokinin (CCK) test can give additional information for the diagnosis of pancreatic disease and for differentiation between inflammatory and malignant pancreatic disease. The CEA concentration in the duodenal fluid after secretin-CCK stimulation in healthy volunteers ranged from 2.5 ng/ml to 25 ng/ml. Four of the patients with pancreatic carcinoma had a concentration that was equal to or exceeded 25 ng/ml, and three had concentrations greater than 50 ng/ml. The levels were higher than 25 ng/ml in all 10 patients with chronic pancreatitis, and the level was over 50 ng/ml in 6 of them. All but one of these patients had abnormal pancreatic secretion. A CEA concentration greater than 50 ng/ml occurred in 3 of the 10 patients with other abdominal diseases. It is concluded that a high CEA concentration in duodenal fluid after secretin-CCK stimulation does not necessarily indicate pancreatic carcinoma. The level may also be elevated in nonpancreatic diseases.

7040 ACUTE PANCREATITIS FOLLOWING RENAL ALLOTRANSPLANTATION: A LETHAL COMPLICATION. (Eng.) Taft, P. M.; Jones, A. C.; Collins, G. M.; Halasz, N. A. (Univ. California Medical Center, San Diego, 225 W. Dickinson St., San Diego, CA 92103). *Am. J. Dig. Dis.* 23(6):541-544; 1978.

The cases of six patients who developed acute pancreatitis following renal allotransplantation are presented. The first patient, a 29-yr-old man, was thought to have developed pancreatitis as a result of the immunosuppressive regimen, which included azathioprine (75 mg, q.i.d.). He has had no relapse after this drug was stopped. He did have a history of recurrent abdominal pain since the age of 16, but there was no proof that it was related in any way to his subsequent pancreatitis. In the second patient, a strong alcoholic history, the immunosuppressive drugs, and a penetrating posterior peptic ulcer could have been involved in the development of fatal pancreatitis. Pancreatitis in the third patient was related to secondary or tertiary hyperparathyroidism. Cessation of immunosuppressive therapy and the intentional sacrifice of the renal graft in an attempt to reverse the progressive sepsis in this patient failed, resulting in his death. In the fourth patient, the insidious nature of post-transplantation pancreatitis was well illustrated. There was no prodrome and no suggestive symptomatology, until the patient presented with a full-blown surgical abdomen. The patient was found to have cholelithiasis, but since the pancreatitis involved only the distal pancreas, it was doubtful that this condition was etiologic. The patient died after he developed a high jejunal fistula with continuing sepsis and progressive pulmonary insufficiency. The fifth patient developed pancreatitis during the second week of treatment for allograft rejection. His initial presentation for rejection may have actually been the early stage of pancreatitis. His alcohol abuse may have set the stage of susceptibility to other agents, such as his immunosuppression, which resulted in clinical pancreatitis. The last patient presented with progressive adult respiratory distress syndrome for which no etiologic agent could be identified. At autopsy, he was found to have acute pancreatitis and no primary pulmonary infection as the cause of death.

7041 CHOLEDOCHOCELE DEMONSTRATED ON PERCUTANEOUS CHOLANGIOGRAPHY: A PATIENT WITH ACUTE FULMINANT PANCREATITIS. (Eng.) Jones, B. (Harvard Medical Sch., 25 Shattuck St., Boston, MA 02115). *Gastrointest. Radiol.* 2(2):145-147; 1977.

The case of a patient in whom a choledochocele, demonstrated by percutaneous cholangiography, was associated with the development of acute fulminant pancreatitis is presented. The patient, a 37-yr-old woman, had previously undergone a bilateral nephrectomy for progressive renal failure due to scleroderma. She developed severe upper abdominal pain that remained unexplained for 4 yr after her initial presentation. A number of gastrointestinal series and an oral cholecystogram had been negative. At the last hospital admission, acute pancreatitis was the clinical diagnosis. This condition apparently deteriorated into hemorrhagic pancreatitis, almost certainly aggravated by her anticoagulant therapy, which she had received since the time of the nephrectomy. The anticoagulant therapy was stopped, and cholangiography was performed. The well-developed class III choledochocele was demonstrated by this procedure. It was decided to postpone surgery until her condition had stabilized, but despite improving liver function tests and decreasing amylase, the patient died 1 week after the diagnosis was made. The altered pressure dynamics and compromised drainage of the biliary and pancreatic ducts by their insertion into the choledochocele was the probable mechanism for the development of obstructive jaundice and acute pancreatitis. Because this rare lesion is potentially curable with surgery, its identification by percutaneous or i.v. cholangiography has important clinical significance.

7042 A SINGLE-CENTRE DOUBLE-BLIND TRIAL OF TRASYLOL THERAPY IN PRIMARY ACUTE PANCREATITIS. (Eng.) Imrie, C. W.; Benjamin, I. S.; Ferguson, J. C.; McKay, A. J.; Mackenzie, I.; O'Neill, J.; Blumgart, L. H. (Royal Infirmary, Glasgow, Scotland). *Br. J. Surg.* 65(5):337-341; 1978.

A double-blind trial of i.v. aprotinin (Trasylol) therapy as a supplement to a standard regimen of conservative management was carried out in 161 patients with primary acute pancreatitis. The patients were subdivided into younger (<60 yr) and older patients (≥60 yr), and subjects in each group were randomly allocated either to Trasylol therapy (starter 500,000 KIU and thereafter 200,000 q.i.d. for 5 days) or to placebo. There were 14 deaths (8.7%), 7 in the Trasylol and 7 in the placebo group, and no significant difference was found in either the mortality or the major complications rate, either overall or within either age group. All 14 patients who died met the objective criteria for severe acute pancreatitis determined by the presence of at least three of a possible nine factors during the first 48 hr of admission. Severe acute pancreatitis was present in 37% of patients, who were evenly distributed between the Trasylol and placebo groups. Neither in those patients with severe nor in those with less severe acute pancreatitis was there any significant difference between the two therapeutic regimens. Supplementary Trasylol therapy at this dosage confers no advantage over standard conservative treatment in the management of patients with primary acute pancreatitis.

7043 SPECIFICITY OF INCREASED AMYLASE TO CREATININE CLEARANCE RATIO IN ACUTE PANCREATITIS. (Eng.) Lankisch, P. G.; Koop, H.; Otto, J.; Oberdieck, U.; Winckler, K.; Wolfrum, D. I. (Medizinische Universitats Klinik, Humboldtallee 1, D-3400 Gottingen, W. Germany). *Digestion* 16(1/2): 160-164; 1977.

Studies were carried out in 33 patients with acute pancreatitis to determine whether the amylase to creatinine clearance ratio (C_{am}/C_{cr}) is specific for acute pancreatitis and whether this index is more useful than routine estimation of serum and urine amylase in these cases. It has been suggested that a ratio above 5.3% is specific for acute pancreatitis. Twenty-one healthy persons and 19 patients with renal insufficiency served as controls. In the 21 normal controls, the mean C_{am}/C_{cr} ratio was 1.8 ± 1.0%. On the day of admission, 28/33 patients with acute pancreatitis had elevated serum and/or urinary amylase levels; however, the C_{am}/C_{cr} ratio was below 5.3% in 10/28 and raised in 18/28 patients. In the remaining five patients with acute pancreatitis, the amylase level was not elevated at the first estimation of the ratio; in one, the ratio was below 5.3% and remained so when amylase increased the following day and in the remaining four, the ratio was raised. In 19 patients with renal insufficiency (serum creatinine >1.5 mg%), the ratio was above 5.3%. Follow-up examinations showed that the estimations of the C_{am}/C_{cr} ratio and serum amylase in one patient with acute pancreatitis was only twice elevated above normal during the course of the disease and, as in the other cases studied, did not seem to parallel the amylase level. The results suggest that the C_{am}/C_{cr} ratio is not a specific index in the diagnosis of acute pancreatitis.

7044 PANCREATIC AND SALIVARY AMYLASE/CREATININE CLEARANCE RATIOS IN NORMAL SUBJECTS AND IN PATIENTS WITH CHRONIC PANCREATITIS. (Eng.) Hegarty, J. E.; O'Donnell, M. D.; McGeeney, K. F.; Fitzgerald, O. (Royal Postgraduate Medical Sch., Hammersmith Hosp., London, England). *Gut* 19(5): 350-354; 1978.

The clearance of pancreatic and salivary amylase relative to creatinine was measured in 26 control subjects and 22 patients with chronic pancreatitis to ascertain the value of the amylase/creatinine clearance ratio in the diagnosis of this disease. Control values for pancreatic amylase clearance were 2.64 ± 0.86% compared with 1.54 ± 0.95% for salivary amylase. In chronic pancreatitis, pancreatic amylase clearance ratios were significantly higher than controls ($p<0.0005$, mean 4.09 ± 1.63). The difference in clearance rate of salivary amylase did not reach a level of significance when compared with the control group. Twelve of the 22 patients showed pancreatic amylase clearance values above the normal limit of 4.4, while only 5 were abnormal when the clearance of total amylase was measured. The patients also showed statistically higher ($p<0.0005$) levels of serum salivary amylase when compared with 69 control sera. No such difference was found for the pancreatic component of serum amylase. Comparison of β_2-microglobulin clearance values showed no statistical difference between patients and controls. The results suggest that this rapid, simple, reproducible, and inexpensive method should be included as part of the investigation of patients with suspected chronic pancreatitis.

7045 VISCOSITY AND TRYPSIN ACTIVITY OF PURE PANCREATIC JUICE IN CHRONIC PANCREATITIS. (Eng.) Tympner, F.; Rosch, W. (Tympner, Medizinische Klinik mit Poliklinik der Universitat Erlangen-Nurnberg, Krankenhausstr. 12, 8520 Erlangen, W. Germany). *Acta Hepatogastroenterol.* 25(1):73-76; 1978.

The viscosity and trypsin activities of pure pancreatic juice were determined in 20 patients with chronic pancreatitis and compared with those in 20 healthy subjects. Both trypsin activity and viscosity were significantly greater in the patients with pancreatitis than in the healthy subjects ($p<0.01$). The determination of viscosity and trypsin activity in pure pancreatic secretions may be useful in the diagnosis of chronic pancreatitis.

7046 THE ELEVATION OF INTRADUCTAL PRESSURE AS A PATHOGENIC FACTOR IN ACUTE PANCREATITIS IN THE RAT [Abstract]. (Eng.) Horn, J.; Diebolder,

H. (Department fur Chirurgie, Universitat Ulm, Ulm, W. Germany). *Ir. J. Med. Sci.* 146(Suppl. 1):47; 1977.

7047 SCREENING TEST FOR PANCREATITIS [Abstract]. (Eng.) Shimamura, J.; Fridhandler, L.; Berk, J. E.; LaRue, S.; Meshkinpour, H. (Dept. Medicine, Univ. California, Irvine, CA). *Clin. Res.* 26(2):113A; 1978.

7048 ABNORMALITIES IN PURE PANCREATIC JUICE (PPJ) FROM HUMAN CHRONIC ALCOHOLICS [Abstract]. (Eng.) Renner, I. G.; Rinderknecht, H.; Valenzuela, J. E.; Douglas, A. P. (Veterans Admin. Hosp., Sepulveda, CA). *Clin. Res.* 26(2):112; 1978.

7049 STEROID TREATMENT AND PANCREATITIS [Abstract]. (Eng.) Bourry, J.; Sarles, H. (INSERM U 31, 46 chemin de la Gaye, 13009 Marseille, France). *Digestion* 16(1/2):205; 1977.

7050 FUNCTIONAL STATUS OF THE LIVER AND ENZYMATIC CHANGES IN PATIENTS WITH CHRONIC PANCREATITIS. (Rus.) Gidaiatov, A. A. (Dept. Gastroenterology, Azerbaidzhan Inst. Roentgenology, Radiology and Oncology, Baku, USSR). *Klin. Med. (Mosk.)* 55(2):50-54; 1977.

7051 ANALYSIS OF INTRAHEPATIC HEMOCIRCULATION IN PATIENTS WITH CHRONIC PANCREATITIS USING RHEOGRAPHIC DATA. (Rus.) Zoria, V. G.; Zarudniak, V. M.; Kadoshchuk, T. A. (Dept. Surgery, Pediatric Faculty, N. I. Pirogov Vinnitsa Medical Inst., Vinnitsa, USSR). *Klin. Khir.* (4):25-29; 1977.

7052 INVESTIGATION OF THE HEMOSTATIC SYSTEM IN CHRONIC PANCREATITIS. (Rus.) Orlov, V. A.; Iakunin, G. A.; Grishina, N. B.; Orekhova, N. S. (Clinical Hosp. No. 20, Moscow, USSR). *Ter. Arkh.* 49(2):80-85; 1977.

7053 SUPPRESSION OF PANCREATIC LIPASE ACTIVITY IN ACUTE PANCREATITIS BY 8-OXYQUINOLIN AND TETRACYCLIN DERIVATIVES. (Rus.) Kamayev, M. F.; Valigura, Ya. S.; Grigorenko, N. V. (Dept. Pediatric Surgery, Lvov Medical Inst., Lvov, USSR). *Klin. Khir.* (4):17-20; 1977.

7054 CHRONIC PANCREATITIS WITH BISALBUMINEMIA: ITS SIGNIFICANCE, DIAGNOSTIC AND THERAPEUTIC ASPECTS [Abstract]. (Fre.) Alexandre, J. L.; Gosselin, M.; Le Calve, J. L.; Letreut, A.; Deugnier, Y.; Gastard, J. (Hopital Pontchaillou, F 35043 Rennes Cedex, France). *Gastroenterol. Clin. Biol.* 1(6/7):608-609; 1977.

7055 LYMPH SORPTION IN ACUTE PANCREATITIS AS A NEW METHOD OF ELIMINATION OF ENDOGENOUS INTOXICATION. (Rus.) Panchenkov, R. T.; Penin, V. A.; Yarema, I. V.; Urtaev, B. M.; Kuznetsov, E. V.; Yatsenko, A. A.; Tarunin, A. F. (Dept. Hosp. Surgery, N. A. Semashko Moscow Medical Inst. Stomatology, Moscow, USSR). *Vestn. Khir.* 118(4):33-36; 1977.

7056 CHRONIC SCLEROSING PANCREATITIS IN RUBELLA EMBRYOPATHY. (Ger.) Burdelski, M.; Lucking, T.; Pichlmayr, R. (Kinderklinik der Medizinischen Hochschule, D-3000 Hannover, W. Germany). *Monatsschr. Kinderheilkd.* 125(5):557-559; 1977.

7057 ACUTE PANCREATITIS OF PSEUDOTUBERCULOUS ETIOLOGY IN CHILDREN. (Rus.) Shapkina, A. P.; Antonenko, F. F.; Vishnyakov, A. K.; Khodov, S. M. (Dept. Pediatric Surgery, Vladivostok Medical Inst., Vladivostok, USSR). *Vestn. Khir.* 118(4):71-74; 1977.

7058 EXOCRINE PANCREATIC FUNCTION IN CHRONIC ALCOHOLICS IN AUSTRIA. (Ger.) Pointner, H.; Flegel, U.; Bayer, P. M.; Czembirek, H.; Kryspin-Exner, K. (I. Medizinischen Universitatsklinik, Lazarettgasse 14, A-1097 Wien, Austria). *Wien. Klin. Wochenschr.* 89(13):452-455; 1977.

7059 CAUSES OF DEATH IN NECROTIZING PANCREATITIS. ANALYTICAL STUDY OF AUTOPSY CASES. (Ger.) Nagel, K. H.; Putzke, H. P. (Institut fur Allgemeine und Spezielle Pathologie der Wilhelm-Pieck-Universitat, Strempelstrasse 14, DDR-25 Rostock, E. Germany). *Dtsch. Z. Verdau. Stoffwechselkr.* 37(1):17-22; 1977.

7060 CHRONIC RELAPSING PANCREATITIS IN A CHILD--ENDOSCOPIC DIAGNOSIS: A CASE REPORT. (Eng.) Alwmark, A.; Jonson, G.; Mattsson, K. (Central Hosp., Kristianstad, Sweden). *Acta Chir. Scand.* 143(4):253-255; 1977.

7061 ACUTE PANCREATITIS SECONDARY TO FUROSEMIDE WITH ASSOCIATED HYPERLIPIDEMIA. (Eng.) Call, T.; Malarkey, W. B.; Thomas, F. B. (Ohio State Univ. Hosp., 410 W. Tenth Ave., Columbus, OH 43210). *Am. J. Dig. Dis.* 22(9):835-838; 1977.

7062 AZATHIOPRINE-ASSOCIATED ACUTE PANCREATITIS. (Eng.) Paloyan, D.; Levin, B.; Simonowitz, D. (Univ. Chicago Hosp., 950 E. 59th St., Chicago, IL 60637). *Am. J. Dig. Dis.* 22(9):839-840; 1977.

7063 ACUTE ALCOHOLIC PANCREATITIS: CURRENT CONCEPTS AND CONTROVERSIES. (Eng.) Kraft, A. R.; Saletta, J. D. (Cook County Hosp., Chicago, IL). *Surg. Annu.* 8:145-171; 1976.

7064 PANCREATICODUODENAL ARTERY ANEURYSMS IN GAS ABSCESS PANCREATITIS. (Eng.) Goodman,

G. A. (Reading Hosp. and Medical Center, West Reading, PA). *J. Can. Assoc. Radiol.* 28(3):222-223; 1977.

7065 ACUTE PANCREATITIS AFTER CIMETIDINE ADMINISTRATION IN EXPERIMENTAL DUODENAL ULCERS [Letter to Editor]. (Eng.) Joffe, S. N.; Lee, F. D. (Royal Infirmary, Glasgow G4 OSF, Scotland). *Lancet* 1(8060):383; 1978.

7066 SPLENECTOMY: ITS PLACE IN OPERATIONS FOR INFLAMMATORY DISEASE OF THE PANCREAS. (Eng.) Haff, R. C.; Page, C. P.; Andrassy, R. J.; Buckley, C. J. (Wilford Hall U.S. Air Force Medical Center, Lackland Air Force Base, TX 78236). *Am. J. Surg.* 134(5):555-557; 1977.

See also, 6667, 6673, 6674, 6675, 6772, 6773, 6805, 6873, 6932, 7031, 7033, 7036, 7174, 7176, 7198, 7205.

LIVER AND BILIARY TRACT

7067 DIAGNOSTIC SIGNIFICANCE AND SPECIFICITY OF BILE CANALICULI ANTIBODY (BCA) IN PATIENTS WITH DIFFERENT LIVER DISEASES AND IN NORMAL CONTROLS. (Ger.) Hess, G.; Arnold, W.; Meyer zum Buschenfelde, K. H. (II. Medizinische Universitatsklinik und Poliklinik, Langenbeckstrasse 1, 6500 Mainz, W. Germany). *Innere Med.* 3(3):131-136; 1976.

Sera from patients with various hepatopathies and from healthy control subjects were tested for the presence of bile canaliculi antibodies (BCA) by the fluorescent antibody technique using cryostat sections of bovine liver. The incidences of BCA were 21/45 in acute hepatitis, 34/65 in chronic active hepatitis (24/29 in hepatitis B surface antigen [HBsAg]-negative and 10/16 in HBsAg-positive patients), 6/24 in liver cirrhosis, 4/17 in primary biliary cirrhosis, 14/39 in clinically healthy HBsAg carriers, and 7/48 in control subjects. It was not possible to clarify the antigenic substrate. In agreement with data in the literature, these results show that the occurrence of BCA has no substantial diagnostic or prognostic value.

7068 ASSESSMENT OF FAT CONTENT OF LIVER BY A PHOTON SCATTERING TECHNIQUE. (Eng.) Puumalainen, P.; Olkkonen, H.; Sikanen, P. (Dept. Physics, Univ. Kuopio, SF-70101 Kuopio 10, Finland). *Int. J. Appl. Radiat. Isot.* 28(9):785-787; 1977.

A photon-scattering method was applied to the measurement of the fat content of the liver in autopsy specimens from five normal subjects and from nine patients with diffuse liver diseases. This technique is based on the determination of the coherently- and Compton-scattered photons in a narrowly collimated geometry using a semiconductor detector and a multichannel analyzer. In the energy spectrum, the peaks due to coherently- and Compton-scattered photons are well distinguished. The ratio of the peak areas comes from $A_{coh}/A_{Compt} = \overline{Z}^3\overline{A}/\overline{Z}$ where $\overline{Z}$ and $\overline{A}$ are the average atomic and mass numbers of the target atoms. The three fatty liver specimens and the four with stasis had significantly lower coherent/Compton ratios compared with normal specimens ($p<0.01$). The coefficient of variation of the repeated studies was under 2%. Equipment suitable for *in vivo* measurement of liver fat content is presented. A broadly collimated 500 mCi ^{241}Am annular source was used as a radiation source and a Ge semiconductor crystal as a detector. A rectangular liver phantom immersed into a water tank was used to test the validity of the method. The phantom was filled with varying concentrations of *tert*-butanol, whose effective charge number is close to that of fatty tissue. The A_{coh}/A_{Compt} ratio correlated highly significantly with the *tert*-butanol content ($r=0.997$). The coefficient of variation was under 3%. This method seems feasible for liver fat measurements *in vivo*, e.g., in following the progress of a disease or the effect of a treatment.

7069 RELATIONSHIP BETWEEN LIVER TESTS AND SERUM IgA, IgM and IgG LEVELS. (Pol.) Hankiewicz, J.; Bujniewicz, E. (I Klinika Chorob Wewnetrznech, Instytut Chorob Wewnetrzynch Sl. AM, ul. Podchorazych 3 m 13, 40-043 Katowice, Poland). *Przegl. Lek.* 35(3):337-342; 1978.

Correlations were studied between the serum IgA, IgG, and IgM levels and the results of liver tests (thymol, Takata-Ara, cadmium, iodide, Kunkel, 66-test, and uranyl acetate test) in 43 patients with liver diseases, 8 patients with diseases of the bile ducts, 20 patients with other diseases, and 12 healthy controls. Correlation was found between the serum immunoglobulin levels and the test results: the increases in the test parameters were usually accompanied by increases in the immunoglobulin

levels; however, not all results of all tests changed in this manner. The negative liver tests were usually accompanied by a lack of change of the immunoglobulin levels. Increases in measured parameters were accompanied mainly by increased IgG levels. Positive Takata-Ara, iodide, cadmium, and Kunkel tests, with a simultaneous lack of change in the thymol test and 66-test, were usually accompanied by an increased IgA level. Changes in the thymol and 66-tests were reflected principally by changes in the IgM levels.

7070 DIAGNOSTIC APPLICABILITY OF INTRA-VITAL MORPHOLOGIC EXAMINATION OF THE LIVER IN CHRONIC HEPATOPATHY. (Pol.) Nowak, H. F.; Boron, P.; Dadan, H.; Szpakowicz, T.; Zalewski, J. (Klinika Chorob Zakaznych, 15-540 Bialystok, Poland). *Patol. Pol.* 28(4):515-519; 1977.

The diagnostic value of intravital morphological investigation of liver specimens obtained by biopsy or by curative or exploratory surgery in 71 patients with various hepatopathies was studied and compared with the clinical diagnosis. The histomorphological diagnosis was in agreement with the clinical diagnosis in 43/71 cases (in 8/15 patients with chronic persistent hepatitis, in 5/9 patients with chronic aggressive hepatitis, in 1/7 patients with chronic aggressive hepatitis with cirrhosis, in 1/2 patients with liver cirrhosis, in 1/8 patients with unspecific chronic hepatitis, in 1/3 patients with primary liver carcinoma, and in 26/27 patients with hepatic metastases). Among the 28 cases in which the histomorphological diagnosis did not agree with the clinical one, exacerbated chronic cholecystitis was diagnosed clinically in 13 cases, liver cirrhosis in 11, and status after viral hepatitis in 2. No clinical diagnosis was established in one case. The findings indicate the usefulness of intravital morphological examination of the liver in conjunction with other diagnostic methods for defining accurately the type of diffuse hepatic lesions and the type of liver tumors involved.

7071 DIAGNOSIS OF EXTRA-HEPATIC ABNORMALITIES ON DYNAMIC STUDY OVER THORACO-ABDOMINAL REGION PRIOR TO HEPATIC IMAGING. (Eng.) Siddiqui, A. R.; Wellman, H. N. (Indiana Univ. Sch. Medicine, 1100 W. Michigan, Indianapolis, IN 46202). *Clin. Nucl. Med.* 3(6):214-216; 1978.

Findings in 262 thoraco-abdominal dynamic studies done at the time of hepatic imaging are reviewed to determine the number and types of extrahepatic abnormalities. Twenty-nine extrahepatic abnormalities were diagnosed solely on the basis of these studies, including pericardial and pleural effusions and decreased perfusion to one lung. Half of these abnormalities were not suspected clinically. The dynamic study is an important part of hepatic imaging and should be performed routinely. Besides aiding in the differential diagnosis of various hepatic lesions, extrahepatic abnormalities can be discovered.

7072 PERCUTANEOUS TRANSHEPATIC CHOLANGIOGRAPHY WITH THE CHIBA NEEDLE. (Por.) Onishi, I.; Carrilho, F. J.; Paranagua, D. F.; Zeitune, J. M. R.; Muarrek, F. J.; Pareja, J. C.; *et al.* (Setor de Radiologia da Gastroclinica de Londrina, Universidade Estadual de Londrina, Londrina, Brazil). *Arq. Gastroenterol.* 14(4):205-209; 1977.

Percutaneous transhepatic cholangiography (PTC) with the Chiba needle was performed in 50 patients with intrahepatic or extrahepatic cholestasis. A success rate of 88% was achieved whether or not the intrahepatic bile duct was dilated. Neoplasia of the bile ducts, head of the pancreas, papilla, and gallbladder were diagnosed in 18 cases, cholelithiasis in 15, acute hepatitis in 3, chronic cholangitis in 2, chronic cholangitis in 2, cholecystoduodenal fistula in 1, pseudocyst of the head of the pancreas in 1, iatrogenic stenosis of the common bile duct in 1, inflammation of the papilla in 1, and pathology of unknown origin in 2. The success rate was 18/18 for neoplasias; 16/18 for cholelithiasis; 6/9 for hepatitis and cholangitis, 3/3 for fistulas, pseudocysts, and iatrogenic stenosis; and 1/2 for pathology of unknown origin. PTC was well tolerated; hemorrhage occurred in only one patient. The findings indicate the great value of PTC in the diagnosis of cholestasis.

7073 PORTAL DIVERSION FOR HEPATIC METABOLIC DISEASES. (Fre.) Bismuth, H.; Franco, D.; Grange, D. (Hopital Paul-Brousse, F 94800 Villejuif, France). *Gastroenterol. Clin. Biol.* 1(11): 903-916; 1977.

A review of the use of portal diversions for the management of liver glycogenosis and hypercholesterolemia is presented. Terminolateral (19) and laterolateral (1) portacaval anastomoses and portacaval transpositions (3) were performed to correct severe glycogenosis (types I, III, and VI) involving life-threatening hypoglycemic accidents, very frequent meals, and growth and/or psychomotor retardation. Complete or partial correction of the hypoglycemia and improved tolerance to fasting occurred in all patients; lactic acidosis, hyperuricemia, and platelet disorders usually disappeared entirely, and remarkable growth spurts were seen in most cases. Improvement was often very gradual and sometimes took up to 1 yr. No specific complications arising from the portal shunt (specifically, no encephalopathies) were seen in any patients up to 10 yr after surgery. Familial type II hyperlipoproteinemia, an autosomal dominant disorder, in its homozygous form generally leads to death before age 20 from atherosclerotic complications. Terminolateral anastomoses have been performed on 11 patients with this disease. All patients benefited from an improvement in symptoms, including the disappearance of xanthomas and an average decrease of 40% in plasma cholesterol and beta-lipoproteins. Angina lessened in five of eight patients, allowing an increase in physical activity. Although atheromatous lesions did not regress, their evolution was arrested. Even though long-term results are not yet available on these patients, the sur-

gery is recommended for homozygous patients showing early xanthomas whose serum cholesterol and beta-lipoproteins cannot be reduced by at least 40% through medical treatment. The mechanism by which portal shunts ameliorate these metabolic disorders is not fully known, although it probably involves the increased availability of peripheral glucose and/or insulin in glycogenosis and a diminished synthesis or accelerated degradation of cholesterol in hypercholesterolemia.

7074 UPTAKE OF IRON BY DUODENAL BIOPSY SPECIMENS FROM PATIENTS WITH IRON-DEFICIENCY ANAEMIA AND PRIMARY HAEMOCHROMATOSIS. (Eng.) Cox, T. M.; Peters, T. J. (Royal Postgraduate Medical Sch., Du Cane Rd., London W12 OHS, England). *Lancet* 1(8056):123-124; 1978.

To investigate the control of iron absorption, initial rates of iron uptake by duodenal mucosa were determined in biopsy specimens from 12 normal subjects, 4 patients with iron deficiency anemia, and 5 patients with primary hemochromatosis. The mucosal iron content in patients with iron deficiency anemia was significantly lower than that in controls ($p<0.05$). When the Fe^{3+} concentration of the incubation medium was 450 μM, there was a threefold increase in iron uptake by biopsy specimens from patients with iron deficiency anemia ($p<0.01$). Uptake at 180 μM Fe^{3+} was also increased. At the higher concentration of 450 μM, iron uptake by specimens from patients with hemochromatosis was no different from normal. In controls and patients with hemochromatosis, unidirectional iron uptake reached a saturation point over the concentration range 18-450 μM Fe^{3+} in the incubation medium. Although uptake at the higher iron concentrations was similar in the two groups, at the lower concentrations, uptake in hemochromatosis patients was significantly greater. Kinetic analysis showed a significantly lower apparent K_t for iron uptake by the mucosa from patients with hemochromatosis (34 ± 6 μM) compared with controls (125 ± 54 μM, $p<0.05$), although the V_{max} was not different. In iron deficiency, there was a significant increase in Vmax (27.2 ± 7.1 pmol/mg/min) in comparison with controls (9.3 ± 1.5, $p<0.01$), and there was an associated rise in K_t (290 ± 184 and 125 ± 54 μM, resp.). This result may be related to the limiting effect of diffusion across the unstirred layer of medium when high V_{max} conditions are operating. The kinetic data suggest that the inappropriately high iron uptake by specimens from the iron-overloaded patients is the result of the affinity for iron being increased in a carrier in the enterocyte.

7075 HEPATIC ADENOMA AND ORAL CONTRACEPTIVES. (Fre.) Hureau, J.; Benit, C.; Delavierre, P.; Bourdais, J. P. (Hopital de Vaugirard, 389, rue de Vaugirard, 75015 Paris, France). *J. Chir. (Paris)* 114(5):339-350; 1977.

A case of hepatic adenoma in a 31-yr-old woman who had been taking oral contraceptives continuously for 10 yr is reported, and the alarming increase of this rare tumor in recent years is discussed. The preoperative diagnosis is fairly easy when hepatic arteriography, radioisotopic scan, and echotomography are combined with radiologic examinations of neighboring organs. Treatment consists of surgical removal of the affected segment and should not be delayed, since painful intratumoral bleeding often occurs. Cataclysmic hepatic hemorrhaging that results when the tumor ruptures externally is responsible for a death rate of 15.9%. Although not conclusively proven, mestranol appears to be the culpable ingredient in oral contraceptives, since 93.1% of women with hepatic adenomas have taken it, whereas only 44.8% of a control group free of hepatic lesions had been given a mestranol preparation. A review of the clinical, pathological, and pathogenic aspects of hepatic adenomas is given.

7076 RADIO- AND ENZYMEIMMUNOASSAY OF SERUM ALPHA-FOETO-PROTEIN IN SECONDARY CANCER OF THE LIVER. (Eng.) Masseyeff, R.; Rey, J. F.; Maiolini, R.; Krebs, B.; Delmont, J. (Laboratoire d'Immunologie, U.E.R. de Medecine, Chemin de Vallombrose, 06000 Nice, France). *Rend. Gastroenterol.* 9(2):91-96; 1977.

Serum alpha fetoprotein (AFP) was quantitated in 97 patients with secondary liver cancer, and radioimmunoassay (RIA) and enzyme-immunoassay (EIA) were compared for their efficacy in this determination. EIA and RIA gave similar results, with a correlation coefficient of 0.98 at $p\geq0.001$. Twenty-three patients had AFP levels of 10 ng/ml or greater. Seven patients had levels >100 ng/ml, the highest being 610 ng/ml. Of the 23 patients with abnormal AFP levels, 45% had the primary tumor in the stomach, whereas only 20% of the 74 patients with normal AFP levels had primary stomach cancer. Further studies are needed to determine whether the site of abnormal AFP production in secondary liver cancer is the primary tumor, the metastatic tumor, or the area surrounding the metastasis. The close correlation between the results of EIA and RIA suggest that they can be used interchangeably, but EIA is a simpler and faster procedure.

7077 CLINICAL AND THERAPEUTIC ASPECTS OF HEPATOCELLULAR CARCINOMA. (Eng.) Johnson, P. J.; Williams, R. (King's Coll. Hosp. and Medical Sch., Denmark Hill, London SE5, England). *Trans. R. Soc. Trop. Med. Hyg.* 71(6):462-465; 1978.

Hepatocellular carcinoma (HC) is reviewed. It is a major problem in certain parts of the Third World, but much less common in the West. In all areas of the world, about 70% of patients with HC have underlying cirrhosis, but the relationship between the two is not clear. Hepatitis B virus and aflatoxin have been suggested as carcinogenic environmental agents. Men are more susceptible to malignant change than are women, and the risk of such change increases with age. Both benign and malignant tumors have been associated with the contraceptive pill. The commonest modes of presentation are per-

sistent right-sided upper abdominal pain and general deterioration in a patient with underlying cirrhosis. Routine liver function tests seldom permit discrimination of HC and cirrhosis, but α-fetoprotein determinations are a valuable discriminatory test, as levels rarely exceed 500 mg/ml in benign liver disease, but are >1,000 mg/ml in HC, and about 70% of HC cases will be positive by this criterion. Hepatic scintiscanning is useful in showing the extent of the lesion. Pathological confirmation is desirable, and this is usually obtained by percutaneous liver biopsy via a right lateral approach. The use of laparoscopy varies widely, but can be of value in selected cases, particularly in determining whether there is peritoneal spread. Hepatic arteriography is of diagnostic value in demonstrating the characteristic appearances of an abnormal vascular pattern when other tests have been inconclusive and in determining the extent of the tumor and its relation to the arterial supply and lobes of the liver. Management depends upon the extent of the tumor and on whether there is underlying cirrhosis. Resection may be undertaken when there is no cirrhosis; up to 7/8 of the liver may be removed. Hepatic artery ligation is useful in relieving pain and shrinking the tumor mass, but may only be used if there is no cirrhosis. In patients without metastasis, liver transplantation may be attempted. When metastases are present or the patient is otherwise too ill for surgery, chemotherapy is the only available approach, and various regimens have been used with varying success.

7078 LIVER METASTASES DISCOVERED DURING HIGH-DOSE EXCRETORY UROGRAPHY. (Eng.) Brennan, R.; Cossrow, J.; Pollack, H. (Thomas Jefferson Univ. Hosp., Philadelphia, PA 19107). *Radiology* 127(2):373-375; 1978.

The detection of hepatic metastases during excretory urography with tomography (EUT) is documented. The discovery of one such case prompted a retrospective review of the records of 106 patients who had had focal hepatic defects on ^{99m}Tc-labeled sulfur colloid liver scans; 18 were found to have had EUT that also included the posterior third to one-half of the right lobe of the liver on the tomograms. Of these 18, 3 had one or more liver masses visualized by EUT as round, lucent, hepatic filling defects during total body opacification. Radiologists performing high-dose EUT should routinely scrutinize the hepatogram because metastases, cysts, or abscesses may be visualized. Final diagnosis of such masses usually depends on additional diagnostic modalities.

7079 PERCUTANEOUS EMBOLIZATION FOR THE MANAGEMENT OF HEPATIC ARTERY ANEURYSMS. (Eng.) Goldblatt, M.; Goldin, A. R.; Shaff, M. I. (Groote Schuur Hosp., Observatory, Cape Town 7925, South Africa). *Gastroenterology* 73(5):1142-1146; 1977.

The cases of three patients who were treated for hepatic artery aneurysms with percutaneous embolization are presented. The first patient was a 55-yr-old woman who presented with hematemesis and debility. Celiac axis arteriography demonstrated a large tortuous aneurysmal sac arising from a branch of the left hepatic artery. Superselective embolization was carried out by injecting pledgets of gelfoam suspended in contrast medium. Celiac arteriography 7 weeks after embolization demonstrated no recurrence of the aneurysm. The second patient, a 30-yr-old male schizophrenic receiving phenothiazines, presented with hematemesis, melena, jaundice, pyrexia, epigastric tenderness, and elevated WBC count. The presence of a pyogenic abscess was suggested by ultrasound and confirmed by examination of a biopsy specimen taken at surgery. Hemoperitoneum and hematobilia were present with the biliary tree grossly distended by a blood clot and a small necrotic hemorrhagic area present in the left lobe of the liver. Celiac arteriography revealed gross extravasation of contrast medium into a cavity in the left lobe. Selective catheterization and embolization of the left hepatic artery controlled the extravasation, and no further bleeding occurred. The third patient, a 17-yr-old boy, was found to have a false aneurysm arising from a small proximal branch of the right hepatic artery following an abdominal gunshot wound. Embolization using autologous clot via a superselective coaxial catheter resulted in occlusion of the small feeding vessel. Experience with these cases suggests that embolic therapy may be the method of choice for hepatic artery aneurysms.

7080 FAMILIAL AND NONFAMILIAL BENIGN RECURRENT CHOLESTASIS DISTINGUISHED BY PLASMA DISAPPEARANCE OF INDOCYANINE GREEN BUT NOT CHOLYLGLYCINE. (Eng.) Van Berge-Henegouwen, G. P.; Ferguson, D. R.; Hofmann, A. F.; De Pagter, A. G. F. (St. Radboud Hosp., Nijmegen, Netherlands). *Gut* 19(5): 345-349; 1978.

To determine whether a defect in uptake of organic anions is present in patients with benign recurrent cholestasis, the plasma disappearance of simultaneously injected indocyanine green and cholylglycine-1-^{14}C was measured in eight patients with asymptomatic benign recurrent cholestasis, 4 with the familial type, as well as 22 healthy control subjects. Evans blue was also simultaneously injected to permit correction for variation in blood volume and speed of mixing. Indocyanine green uptake was decreased in all three patients with definite nonfamilial benign recurrent cholestasis, but was normal or increased in the four patients with the familial form of the disorder. By contrast, cholylglycine-1-^{14}C uptake was abnormal in one patient with each type of the disorder. Thus, patients with nonfamilial benign recurrent cholestasis have a defect in indocyanine green uptake, and patients with benign recurrent cholestasis are heterogeneous with respect to organic anion uptake.

7081 FREQUENCY OF INTRAHEPATIC ARTERIOVENOUS FISTULA AS A SEQUELA TO PERCUTANEOUS NEEDLE PUNCTURE OF THE LIVER. (Eng.) Okuda, K.;

Musha, H.; Nakajima, Y.; Takayasu, K.; Suzuki, Y.; Morita, M.; *et al.* (Chiba Univ. Hosp., Chiba, 280, Japan). *Gastroenterology* 74(6):1204-1207; 1978.

The incidence of intrahepatic arteriovenous fistula after needle biopsy of the liver, percutaneous transhepatic cholangiography, and transhepatic catheterization of an intrahepatic bile duct or portal vein was determined by studying the hepatic arteriograms obtained within 1 month of the transhepatic procedure. An arteriovenous fistula, mostly arterioportal, occurred in 5 of the 93 patients after biopsy, in 3 of 79 after percutaneous transhepatic cholangiography, and in 7 of 26 after catheterization. None of the fistulae was so large and close to the porta hepatis as to cause portal hypertension. In one patient with an intrahepatic bile duct carcinoma, the long track of a 0.7-mm caliber needle became a fistula draining arterial blood into the parenchyma. In another, an aneurysm was found after biopsy and percutaneous transhepatic cholangiography. A small intrahepatic fistula may seal itself. A tissue defect in the liver parenchyma may eventually be filled by regenerating liver cells or the canal may be distorted and interrupted by tissue regeneration.

7082 PERFUSION VASCULARITY MISMATCH IN LIVER HEMANGIOMAS. (Eng.) Front, D.; Hardoff, R.; Israel, O.; Schneck, S. O. (Rambam Medical Center, Haifa, Israel). *Clin. Nucl. Med.* 3(6):212-213; 1978.

Three cases of large cavernous hepatic hemangiomas in which a perfusion defect in the dynamic study and slow filling of the lesion by a blood pool agent were observed are presented. This finding is explained by the low perfusion and the large blood volume of cavernous hemangiomas. When such a lesion is suspected, a late blood-pool study should be performed to demonstrate the true vascularity of the lesion.

7083 HEMOPERITONEUM FROM SPONTANEOUS RUPTURE OF HEMANGIOMA OF THE LIVER, THE VALUE OF ANGIOGRAPHIC DIAGNOSIS: A CASE REPORT. (Eng.) Nyman, U. (Malmo General Hosp., S-214 02 Malmo, Sweden). *Fortschr. Geb. Roentgenstr. Nuklearmed.* 128(2):237-238; 1978.

A case of spontaneous rupture of a liver hemangioma in which angiography was used as a diagnostic procedure is presented. The patient, a 37-yr-old man, was hospitalized in shock, and the peritoneal cavity was found at laparotomy to be filled with blood originating from a ruptured hemangioma on the lower border of the left lobe of the liver. The hemorrhage was controlled by suturing, but the lesion could not be excised. The exact site and extention of the hemangioma was demonstrated by angiography 2 days later, thereby facilitating proper surgical removal of the bleeding source.

7084 FATAL INTRAHEPATIC HEMORRHAGE AFTER PERCUTANEOUS LIVER BIOPSY USING A MENGHINI NEEDLE: A RARE BUT REAL COMPLICATION. (Eng.) Whittle, T. S., Jr. (Veterans Admin. Hosp., 109 Bee St., Charleston, SC 29403). *South. Med. J.* 70(11): 1355-1356; 1977.

A case of fatal intrahepatic hemorrhage in a 62-yr-old woman following percutaneous liver biopsy with a Menghini needle is reported. The biopsy was done with a needle of intermediate caliber (1.2 mm) via a posterior transcostal approach. The first unsuccessful attempt was followed immediately by a second attempt with the recovery of an adequate core of tissue. The patient required meperidine hydrochloride after complaining of nausea and mild right upper quadrant pain. The patient died the day following the procedure. At autopsy, a large subcapsular hematoma involving the dome and lateral portion of the right lobe of the liver was present. There was 200 ml of freshly clotted blood within the peritoneal cavity. Sectioning the liver revealed an extensive intrahepatic subcapsular hematoma in communication with a hemorrhagic linear portal tract corresponding to the tract of the needle. This is the first known report of a fatal intrahepatic hemorrhage after percutaneous Menghini needle biopsy in a patient without a hemorrhagic diathesis or underlying liver disease.

7085 CIMETIDINE CHOLESTATIC JAUNDICE IN CHILDREN. (Eng.) Lilly, J. R.; Hitch, D. C.; Javitt, N. B. (Univ. Colorado Sch. Medicine, Denver, CO 80262). *J. Surg. Res.* 24(5):384-387; 1978.

Liver function tests, including serum bile acid determination, were carried out as part of a prospective clinical investigation of the efficacy of cimetidine therapy in children with peptic ulcer disease; the results in five patients, aged 14, 3, 2, 1.5, and 1 yr, are presented. The patients received cimetidine (20-30 mg/kg/day) i.v. or p.o., and the total daily amount was given in four to six equal increments. Two patients had pre-existing liver disease. In the latter patients, peak serum bilirubin levels occurred before the institution of cimetidine therapy. There was a second minor rise in one of these patients 14 days after treatment was started. In the other three patients, the bilirubin level was elevated 14, 37, and 16 days, resp., after the initiation of cimetidine; the maximum elevations were 1.8, 2.9, and 2.3 mg%, resp. Total serum bile acids increased eight- and ninefold in the patients with pre-existing liver disease after cimetidine was started. In the three patients with normal liver function, the maximum total serum bile acid reached 14, 32, and 34 μM on the 10th, 15th, and 4th days after the initiation of therapy, resp. The values fell below the original value in one patient with liver disease and remained somewhat above the original value in the other. The values returned to normal before or shortly after discontinuing the drug in the patients with normal hepatic function. Because transaminases in all patients remained within, or almost within, normal limits, the elev-

ated serum bile acids may represent a transient cholestasis rather than a manifestation of liver cell necrosis.

7086 PORPHYRIA CUTANEA TARDA TREATED WITH LOW DOSES OF ANTIMALARIAL AGENTS: LIVER FINDINGS. (Cze.) Chlumsky, J.; Dobias, J.; Chlumska, A.; Malina, L. (I. interni klinika lekarske fakulty hygienicke, Universita Karlova, Srobarova 50, 100 34 Praha 10, Czechoslovakia). *Cas. Lek. Cesk.* 116 (45):1404-1406; 1977.

The effectiveness of the antimalarial agent chloroquine (125 mg twice weekly for 3-8 months) was studied in 32 patients with porphyria cutanea tarda. All patients achieved complete clinical and metabolic remission. The chloroquine tolerance proved to be satisfactory, even though a transient increase in the serum transaminase activity pointed to a certain stress of the hepatic parenchyma. Hepatic morphology was studied in 29 patients; the treatment caused no morphological changes in 25/29 cases and deterioration in 4 (2 patients with chronic hepatitis, 1 patient with uncharacteristic changes, and 1 with fibrosis). Hepatological investigations supplemented by liver biopsy are useful for the determination of the optimal complex treatment of the underlying metabolic disorder. Concomitant liver cirrhosis and chronic hepatitis call for simultaneous liver function-supporting treatment.

7087 DIAGNOSIS AND TREATMENT OF STENOSES AND OBSTRUCTIONS OF THE INTRAHEPATIC BILE DUCTS. (Ger.) Spieler, U.; Largiader, F.; Ammann, R. (Kantonsspital, CH-8091 Zurich, Switzerland). *Helv. Chir. Acta* 44(4):471-475; 1977.

The diagnosis and treatment of 15 patients with obstruction of the intrahepatic bile ducts are described. Malignant tumors were the cause of obstruction in 11 cases, sclerosing cholangitis in 3, and post-traumatic skrinkage of scar in 1. The preoperative diagnosis was established by percutaneous transhepatic cholangiography in eight cases, by endoscopic retrograde cholangiography in four, and by laparoscopy in three. The obstruction was in the region of the hepatic bifurcation in 14 cases and in the area of the left hepatic duct in 1 case. Resection of the hepatic bifurcation and hepatic lobe with hepaticojejunostomy was performed in one case, resection of the hepatic bifurcation with hepaticojejunostomy in four, hepaticojejunostomy according to Longmire in two, and bougienage with inner splinting of the bile duct in eight cases. The postoperative mortality was 26%. The results were good concerning the restoration of bile drainage after hepaticojejunostomy and inner splinting, and poor after Longmire's operation. Primary carcinoma involving the junction of the hepatic ducts may be regarded as resectable, if the proximal extension of the tumor is limited to below the second bifurcation of the intrahepatic bile ducts in both the right and left lobes and if the proper hepatic artery and portal vein are not invaded.

7088 LIGATION OF THE HEPATIC ARTERY. (Pol.) Piotrowicz, W.; Ancyparowicz, S.; Kawalski, A. (Klinika Chirurgii Ogolnej CMKP, ul. Czerniakowska 231, 00-416 Warsaw, Poland). *Pol. Tyg. Lek.* 32(45): 1771-1774; 1977.

The literature on ligation of the hepatic artery is reviewed. The indications for ligation of the hepatic artery are hepatic trauma, bleeding liver tumors, and rupture of an aneurysm of the hepatic artery. Ligation of the hepatic artery with subsequent intra-arterial treatment with 5-fluorouracil has been applied successfully in the treatment of patients with liver tumors. The mortality of ligation of the hepatic artery is about 18%.

7089 LIGATURE OF A HEPATIC ARTERY FOR LIVER TUMOR. (Fre.) de Montalier, H.; Boiselle, J. C. (Hopital Bichat, 170, boulevard Ney, 75018 Paris, France). *Ann. Chir.* 31(8):711-718; 1977.

The palliative treatment of multiple liver tumors by ligature of the hepatic artery is reviewed, and two cases of hepatic artery ligature for multiple liver metastases from carcinoid tumors of the small intestine are presented. Both patients had severe symptoms of carcinoid tumors, with flush and diarrhea and high urinary levels of 5-HIA (409 and 68 mg/24 hr, resp.). The clinical symptoms disappeared immediately after surgery and the 5-HIA levels were lowered within 5 days (to 72.5 and 47.3 mg/24 hr, resp.). There were transitory perturbations in SGPT, prothrombin, and bilirubin levels, but the values normalized within 2 weeks. One patient was in excellent health 18 months later; the other died after a total remission lasting 20 months. A review of the literature reveals nine similar cases with total remissions beginning right after surgery; all patients were still in good health 10 weeks to 18 months later. When ligature of the hepatic artery was performed for other types of metastases and for multiple hepatomas, the mean survival of patients was not much improved (from 75 days to 4.5 months), but the clinical remission was often excellent. When local chemotherapy was associated with the surgery (usually 5-fluorouracil at 12 mg/kg/day for 20 to 45 days, infused into the distal end of the hepatic artery), remissions of up to 22 months have been obtained, but the results are still too preliminary to determine the effectiveness of this combination treatment.

7090 ALTERED DRUG METABOLISM AFTER GLUTETHIMIDE IN LIVER DISEASE [Abstract]. (Eng.) Farrell, G. C.; Cooksley, W. G. E.; Powell, L. W.; Cash, G. A. (Royal Brisbane Hosp., Brisbane, Australia). *Clin. Res.* 26(2):109A; 1978.

7091 CEA AND THE LIVER [Letter to Editor]. (Eng.) Barritt, A. S.; Zamcheck, N.; Loewenstein, M. S. (Veterans Admin. Hosp., Salem, VA 24153). *Gastroenterology* 73(4, Part 1):862-863; 1977.

7092 STRUCTURE AND CONCENTRATION OF DUODENAL FERRITIN IN IRON STORAGE DISORDERS [Abstract]. (Eng.) Halliday, J. W.; Mack, U.; Powell, L. W. (Dept. Medicine, Univ. Queensland, Brisbane 4029, Queensland, Australia). *Clin. Exp. Pharmacol. Physiol.* 4(5):466-467; 1977.

7093 CLINICAL EXPERIENCE IN STUDYING HEPATIC TISSUE CIRCULATION. (Rus.) Rutkovsky, O. V.; Sukhotsky, S. S.; Semendyaeva, M. E.; Galperin, E. I. (Inst. Organ and Tissue Transplantation, USSR Ministry Health, USSR). *Sov. Med.* (9):104-107; 1977.

7094 LIVER SUBSTITUTION AND LIVER GRAFTING. (Ger.) Pichlmayr, R.; Bockhorn, H.; Bunzendahl, H. (Medizinische Hochschule Hannover, Karl-Wiechert-Allee 9, D-3000 Hannover 61, W. Germany). *Munch. Med. Wochenschr.* 120(7):207-210; 1978.

7095 CLINICAL AND SURGICAL ASPECTS OF LIVER RESECTION. (Ger.) Grill, W. (Kreiskrankenhaus, D-8130, Starnberg, W. Germany). *Munch. Med. Wochenschr.* 120(7):211-214; 1978.

7096 UREA CYCLE ENZYME DEFICIENCIES IN THE ACUTE FATTY LIVER OF PREGNANCY (AFLP) [Abstract]. (Eng.) Weber, F., Jr.; Snodgrass, P.; Rao, P.; Powell, D.; Huffman, S.; Brady, P. (Veterans Admin. Hosp., Lexington, KY). *Gastroenterology* 72(5, Part 2):1146; 1977.

7097 HEMOBILIA: SOME SALIENT FEATURES AND THEIR CAUSES. (Eng.) Sandblom, P.; Mirkovitch, V. (Emory Univ. Sch. Medicine, 69 Butler St., Atlanta, GA 30303). *Surg. Clin. North Am.* 57(2):397-419; 1977.

7098 VASCULAR OCCLUSION. (Eng.) Mays, E. T. (Univ. Kentucky Coll. Medicine, Lexington, KY 40502). *Surg. Clin. North Am.* 57(2):291-323; 1977.

7099 OSTEOMALACIA, OSTEOPOROSIS, AND PARATHYROID FUNCTION IN CHRONIC LIVER DISEASE [Abstract]. (Eng.) Long, R. G.; Meinhard, E.; Varghese, Z.; Willis, M. R.; Sherlock, S. (Royal Free Hosp., London, England). *Gut* 18(5):A401; 1977.

7100 HISTOTOPOGRAPHY OF PORPHYRINS IN LIVER AND KIDNEYS IN DIFFERENT FORMS OF PORPHYRIA AND IN OTHER DISEASES [Abstract]. (Eng.) Zawirska, B. (Dept. Pathological Anatomy, Medical Acad., Wroclaw, Poland). *Folia Histochem. Cytochem. (Krakow)* 15(2):169; 1977.

7101 THIN LAYER CHROMATOGRAPHY AND FLUORESCENT SCANNING ANALYSIS OF PORPHYRINS. (Eng.) Miura, T.; Torinuki, W. (Tohoku Univ. Sch. Medicine, Sendai, Japan). *Tohoku J. Exp. Med.* 121(1):57-61; 1977.

7102 PORPHYRIA CUTANEA TARDA FOLLOWING LEAD UPTAKE: A CASUISTIC CONTRIBUTION TO ETIOLOGY. (Ger.) Zschunke, E.; Wolf, I. (Zentralinstitut fur Arbeitsmedizin, Noldnerstrasse 40, DDR-1134 Berlin, E. Germany). *Z. Gesamte Inn. Med.* 32 (11):248-250; 1977.

7103 LIVER RUPTURE: A REVIEW. (Nor.) Tveter, K. J.; Ramstad, H. (Aust-Agder Sentralsjukehus, Aust-Agder, Norway). *Tidsskr. Nor. Laegeforen.* 98(1):4-9; 1978.

7104 SCHWANNOMA OF THE DIGESTIVE TRACT WITH HEPATIC METASTASES. (Fre.) Duriez, R.; Daly, J. P.; Halpert, J.; Larroque, P.; Thevenot, J.; Pats, B. (Hopital d'Instruction des Armees Begin, 69, avenue de Paris, F 94160 Saint-Mande, Paris, France). *Ann. Med. Interne (Paris)* 128(11): 895-897; 1977.

7105 PLACE OF AUTONOMOUS LIVER TUBERCULOSIS IN HEPATIC PATHOLOGY. (Fre.) Kayabali, I.; Cam, R.; Kurterdem, E.; Aksoy, F.; Keles, C.; Demir, S.; Okesli, N. (Clinique Chirurgicale de la Faculte de Medecine, Ankara, Turkey). *Lyon Chir.* 73(4):282-284; 1977.

7106 IDENTIFICATION OF THE DEFECT IN CHOLIC ACID (CA) SYNTHESIS IN CEREBROTENDINOUS XANTHOMATOSIS (CTX) [Abstract]. (Eng.) Salen, G.; Shefer, S.; Cheng, F. C.; Mosbach, E. H. (Veterans Admin. Hosp., East Orange, NJ). *Gastroenterology* 72(5, Part 2):1125; 1977.

7107 RECENT DEVELOPMENTS IN HEPATOBILIARY SURGERY. (Eng.) Altman, R. P. (Children's Hosp. Natl. Medical Center, Washington, DC). *Pediatr. Ann.* 6(5):87-97; 1977.

7108 BILE COMPOSITION AND "BILE CAST" FORMATION AFTER LIVER TRANSPLANTATION IN MAN [Abstract]. (Eng.) McMaster, P.; Cusick, C.; Herbertson, B.; Calne, R. Y.; Williams, R. (Dept. Surgery, Univ. Cambridge, Cambridge CB2 2QQ, England). *Eur. Surg. Res.* 9(Suppl. 1):107; 1977.

7109 THE ROLE OF SPLANCHNIC CIRCULATION IN THE REVASCULARIZATION OF THE AUXILIARY LIVER IN EXTRACORPOREAL CIRCULATION: EXPERIMENTAL DATA. (Ita.) Ceriati, F.; Ardito, G.; Cavallaro, A.; Cavicchioni, C.; Aronne, O.; Lemmo, G.; Garcovich, A. (Istituto di Patologia Speciale Chirurgica e Propedeutica Clinica, Universita Catolica "S. Cuore," Rome, Italy). *Chir. Patol. Sper.* 24(2): 119-129; 1976.

7110 ELECTIVE HEPATIC RESECTIONS. (Eng.) Adson, M. A.; Beart, R. W., Jr. (Mayo Clinic, Rochester, MN 55901). *Surg. Clin. North Am.* 57(2):339-360; 1977.

See also, 6778, 6779, 6796, 6800, 6803, 6817, 6922, 6932, 7025, 7050, 7132, 7143, 7144, 7172, 7177, 7194, 7233, 7239, 7240, 7241, 7244, 7245, 7246, 7251, 7252, 7253, 7269.

LIVER AND BILIARY TRACT

Hyperbilirubinemic States

7111 FACTORS INFLUENCING THE INCIDENCE OF NEONATAL JAUNDICE. (Eng.) Friedman, L.; Lewis, P. J.; Clifton, P.; Bulpitt, C. J. (Queen Charlotte's Hosp., London W6 OXG, England). *Br. Med. J.* 1(6122):1229-1300; 1978.

To determine whether maternal oxytocin infusion or other factors are related to the development of neonatal jaundice (peak plasma bilirubin ≥205 μM), the rate of neonatal jaundice was analyzed in 12,461 single births at one hospital during a 5-yr period. Maternal oxytocin administration was associated with jaundice in 15.3% of neonates, whereas jaundice occurred in only 12.1% of neonates whose mothers did not receive oxytocin ($p<0.001$). The effect of oxytocin infusion on jaundice was independent of gestational age at birth, sex, race, epidural anesthesia, method of delivery, and birth weight, each of which was itself significantly associated with neonatal jaundice ($p<0.001$). The effect of oxytocin, however, was small, producing a calculated mean increase in peak plasma bilirubin concentration of 8.6 μM (0.5 mg/100 ml); this excess was independent of sex and less than the effect of the baby being born 1 week early. The results show that both oxytocin and epidural anesthesia have a small effect on the incidence of neonatal jaundice, which fact probably explains the conflicting reports on the effects of these factors.

LIVER AND BILIARY TRACT

Nonviral Hepatitis and Hepatic Injury

7112 FATAL HEPATIC NECROSIS IN ASSOCIATION WITH THE USE OF HYCANTHONE: A CASE REPORT. (Eng.) Buchanan, N.; Thatcher, C. J.; Cane, R. D.; Bartolomeo, B. (Baragwanath Hosp., Johannesburg, South Africa). *S. Afr. Med. J.* 53:257-258; 1978.

A case of fatal acute massive hepatic necrosis secondary to the administration of hycanthone is reported. An 11-yr-old boy presented with hematuria, and his urine was found to contain *Schistosoma hematobium* ova. Hycanthone (100 mg, i.m.) was administered. The next day the patient vomited, became jaundiced, confused, and restless, and then became agitated (promethazine hydrochloride, 25 mg, was given); treatment for hepatic failure was begun. The next day the patient lapsed into coma, had cardiac arrest and was resuscitated, and was treated for hyperkalemia. Four additional episodes of cardiac arrest ensued, and the child died. Autopsy revealed large areas of hemorrhage, ulceration, and polypoid granulations in the bladder and irregular mottling of the liver with alternating yellowish and dark areas. Histologically, the bladder had numerous bilharzia ova in all layers,

and the liver showed acute massive necrosis of short duration. It was discovered that the child was hepatitis B surface antigen-positive without history of previous disease. Excluding underlying liver disease, which may require serological or biochemical assessment, is a chief problem that makes the correct and widespread use of hycanthone impracticable.

7113 OXACILLIN HEPATITIS: TWO PATIENTS WITH LIVER BIOPSY, AND REVIEW OF THE LITERATURE. (Eng.) Bruckstein, A. H.; Attia, A. A. (St. Luke's Hosp., 113th St. and Amsterdam Ave., New York, NY 10025). *Am. J. Med.* 64(3):519-522; 1978.

Hepatotoxicity associated with i.v. sodium oxacillin therapy is reported in two drug abusers cured of staphylococcal endocarditis. One patient received 16 g oxacillin daily, and the other 12 g. Coincident with the administration of oxacillin, marked increases in hepatic SGOT (up to 1,380 IU in the first patient, to 420 IU in the second) and SGPT (up to 1,164 IU in the first patient, to 367 IU in the second) were observed, and liver biopsy showed nonspecific hepatitis. Upon cessation of oxacillin therapy, liver enzyme values returned to(ward) normal. Other reports of oxacillin-associated changes in hepatic enzyme levels are reviewed; further observation of oxacillin-associated hepatotoxicity is warranted.

7114 HEPATITIS SYPHILITICA: A CLINICO-PATHOLOGICAL STUDY OF 25 CASES. (Eng.) Jozsa, L.; Timmer, M.; Somogyi, T.; Feher, J. (Natl. Inst. Traumatology, Budapest, Hungary). *Acta Hepatogastroenterol. (Stuttg.)* 24(5):344-347; 1978.

Clinical and biochemical findings indicative of liver damage are reported in association with early syphilis. Of 175 patients with early untreated syphilis, 25 had laboratory tests indicative of hepatic damage (increased serum bilirubin levels, increased ESR, positive colloid lability, increased SGPT and SGOT activity, abnormal prothrombin time and BSP value, altered serum protein and Ig levels). Light microscopy of biopsy material from the 25 patients showed slight or severe liver damage in 23 cases. There was proliferation of endothelial and Kupffer cells; leukocyte and lymphocyte infiltration of the sinusoids, arteries, and veins; narrowing of the lumena of vessels; focal necrosis; destruction of the reticulin structure; periportal inflammation; and fibrosis. In 17 cases, treponemes were demonstrated in the biopsy. After 2 months of penicillin treatment, nearly all of these features had reversed and returned to normal. Four specimens were examined before treatment and two after treatment using electron microscopy. Reduced glycogen content was observed. The mitochondrial matrix contained abundant electrodense material. Lysosomes were increased in size and number. The endoplasmic reticulum was generally degranulated and tubularized. Intracellular edema and vacuolization were observed. Lipid vacuoles were occasionally seen. Treponemes were demonstrated. These changes reversed after penicillin therapy. It is concluded that in some cases of syphilis, a characteristic hepatitis occurs at an early stage of the disease.

7115 CONGENITAL SYPHILITIC HEPATITIS: A RADIONUCLIDE STUDY. (Eng.) Gates, G. F.; Stanley, P.; Gwinn, J. L.; Miller, J. H. (Children's Hosp., 4650 Sunset Blvd., Los Angeles, CA 90054). *Radiology* 128(1):163-164; 1978.

The case of a 2-month-old girl in whom congenital syphilitic hepatitis was discovered by skeletal roentgenography is presented. The patient had marked hepatosplenomegaly; an erythematous, desquamating rash on the thighs; anemia; and leukocytosis. The serum alkaline phosphatase level was 474 IU. Hepatic scintigraphy with ^{99m}Tc sulfur colloid showed no uptake in most of the liver, but there was marked splenic, bone marrow, and lung uptake. Skeletal radiographs showed periosteal elevation along the shafts of all the long bones and proximal tibial metaphyseal irregularities suggestive of congenital syphilis; this diagnosis was confirmed by a venereal disease research laboratories titer of 1:128 and a positive fluorescent treponemal antibody reaction. After a 10-day course of procaine penicillin, the liver and spleen sizes were decreased and there was improved liver uptake of radiocolloid with decreased spleen size, although bone marrow and lung accumulation persisted. A liver scan 6 months later was normal.

7116 INTRAHEPATIC CHOLESTASIS INDUCED BY DRUGS AND CHEMICALS. (Eng.) Plaa, G. L.; Priestly, B. G. (Faculte de Medecine, Universite de Montreal, C.P. 6128, Montreal, Quebec, Canada). *Pharmacol. Rev.* 28(3):207-273; 1977.

7117 PROTECTIVE EFFECTS OF NUTRITIONAL STATUS ON DRUG-INDUCED FATTY LIVER AND HEPATOCELLULAR NECROSIS [Abstract]. (Eng.) Sabesin, S. M.; Kinnard, M. S. (Univ. Tennessee Center Health Sciences, Memphis, TN). *Gastroenterology* 72(5, Part 2):1124; 1977.

7118 HEPATOTOXICITY OF COMBINATION CHEMOTHERAPY FOR ACUTE MYELOCYTIC LEUKEMIA [Letter to Editor]. (Eng.) Penta, J. S.; Von Hoff, D. D.; Muggia, F. M. (Natl. Cancer Inst., Bethesda, MD 20014). *Ann. Int. Med.* 87(2):247-248; 1977.

See also, 6922, 7085.

Acute Viral Hepatitis

7119 A NEW HUMAN HEPATITIS VIRUS. (Eng.) Zuckerman, A. J. (London Sch. Hygiene and Tropical Medicine, London, England). *Nature* 271 (5641):113-114; 1978.

Evidence for the existence of a third type of human viral hepatitis is reviewed. The identification of specific viral antigenic markers of hepatitis A (HA) and hepatitis B (HB) permits specific diagnosis and has lead to the recognition of a third form of hepatitis unrelated to either HA or HB, referred to in the United States as non A, non B hepatitis (NANBH). NANBH is now the most common form of hepatitis occurring after blood transfusion in some areas of the world. Serum samples from five blood donors implicated in the transmission of post-transfusion hepatitis, which had been stored frozen since the 1950s, were tested; two of the donor sera contained HB virus and transmitted HB to all susceptible recipients, two of whom developed hepatic coma. The remaining three sera did not contain HB markers but nevertheless transmitted a form of hepatitis to nine volunteer recipients that could not be attributed to HA virus (HAV), HB virus (HBV), cytomegalovirus, or Epstein-Barr virus (EBV). The incubation period ranged from 18-89 days, and the clinical illness was similar to HB. Two volunteers developed evidence of persistent liver damage. In a separate study, 16 of 44 patients with NANBH had persistent biochemical evidence of liver damage 6 months after the acute illness; in 10 patients, the abnormality persisted 1-3 yr, and liver biopsy revealed histological evidence of chronic liver damage. It was further observed that 9/22 patients who received placebo (albumin solution) developed evidence of chronic hepatitis, whereas only 1/11 who received normal Ig and 0/11 who received HB Ig did so. When the cause of acute hepatitis was investigated in 45 patients at one hospital, 20 had no laboratory evidence of infection with HAV, HBV, cytomegalovirus, or EBV. It was noted that in nearly half of these patients, the infection followed the type of exposure traditionally associated with HB infection. These reports suggest that (1) a carrier state of NANBH exists, (2) infection must be common since pooled Ig seems to contain prophylactic activity, and (3) this infection may progress to chronic liver disease. There is an urgent need to develop specific laboratory tests for identifying the virus or viruses involved.

7120 FULMINANT HEPATITIS: REVIEW OF 137 CASES. I. COMPLICATIONS. (Fre.) Nusinovici, V.; Crubille, C.; Opolon, P.; Touboul, J. P.; Darnis, F.; Caroli, J. (Hopital Saint-Antoine, 184, rue du Faubourg-Saint-Antoine, F 75012 Paris, France). *Gastroenterol. Clin. Biol.* 1(11):861-873; 1977.

The principal complications in a series of 137 patients in grade IV coma resulting from fulminant hepatitis are discussed. The etiology of the hepatitis was viral in 85% of cases and drug related (especially isoniazid) in 8%. Upper digestive tract hemorrhages occurred in 39% of patients, with 48% of patients who received corticosteroids hemorrhaging, whereas only 27% of patients not treated with steroids hemorrhaged ($p<0.02$). Cerebral edema was difficult to demonstrate clinically, but was present in 24% of necropsied patients; treatment with furosamid and/or mannitol did not seem to improve the edema. Severe hyperlactatemia with acidosis and hypocapnia was seen in 9% of the patients; its evolution was always fatal. Hyperamylasemia was present in 53% of the patients. In 19% of necropsied patients, macroscopic pancreatic lesions could be observed. Plasmatic and globular hypovolemia, which was refractive to transfusions, was present in 47% of the patients. Proteinuria (>0.50 g/24 hr) was observed in 30% of the patients. Creatinemia >15 mg/l was found in 26/35 patients tested; all of these died, whereas 7/9 patients with creatinine of <15 mg/l survived. Septicemia developed in 20% of patients and it was fatal in 6%. Overall mortality was 82.5% in spite of symptomatic treatment (maintenance of hydroelectrolytic and volumetric equilibrium, assisted ventilation, total transfusions, and the administration of human albumin, furosamid, lactulose, and anticonvulsants) and curative treatment (corticotherapy, hemodialysis, perfusions with coenzyme A, and administration of plasma rich in anti-HBs antibodies).

7121 FULMINANT HEPATITIS WITH COMA: A REVIEW OF 137 CASES. II. COURSE AND PROGNOSIS. (Fre.) Nusinovici, V.; Crubille, C.; Opolon, P.; Touboul, J. P.; Darnis, F.; Caroli, J. (Hopital Saint-Antoine, 184, rue du Faubourg-Saint-Antoine, F 75012 Paris, France). *Gastroenterol. Clin. Biol.* 1(11):875-886; 1977.

Experience with 137 cases of fulminant hepatitis is reviewed. Fulminant hepatitis led to death in 82.5% of the cases. Etiology did not influence the outcome of the disease. Of statistical significance in predicting the prognosis were age (average age of the 24 survivors was 29 ± 11 versus 38 ± 16 in the 113 fatalities, $p<0.02$), depth of coma ($p<0.001$), convulsions ($p<0.01$), gastrointestinal bleeding ($p<0.001$), creatinemia (14 ± 5 mg/l in survivors versus 38 ± 26 mg/l in fatalities, $p<0.02$), urinary urea (20 ± 12 g/24 hr versus 12 ± 9 g/24 hr, resp., $p<0.01$), hypocapnia ($p<0.05$), galactose clearance ($p<0.05$), prothrombin time ($p<0.02$), factor V level ($p<0.001$), fibrinogen level ($p<0.02$), ethanol test ($p<0.05$), von Kaulla's test ($p<0.01$), and hepatocyte volume ($p<0.05$). The principal causes of death were decerebration (50%), hemorrhage (17.6%), cardiovascular collapse (11.5%), and sepsis (6%). Hepatic regeneration was present in 17 patients at the time of death, but the causes of death in these patients did not differ significantly from those of other patients. When patients received hemodialysis with a polyacrylonitrile membrane, they regained consciousness significantly more often than did nondialyzed patients (6/13 vs 5/96, $p<0.001$). In the latter patients, transient consciousness was al-

ways accompanied by liver regeneration. Hemodialyzed patients also lived longer in a coma than did nondialyzed patients (7.6 ± 6 days versus 3.9 ± 2.6 days, $p<0.02$). The overall survival rate was only 17.5% and was not influenced by the type of treatment. Of the 24 survivors, 21 were completely healed after a few months, 1 had chronic hepatitis, and 1 had acute chronic hepatitis.

7122 HEPATITIS IN CLINICAL LABORATORIES 1975-76. (Eng.) Grist, N. R. (Ruchill Hosp., Glasgow G20 9NB, England). *J. Clin. Pathol.* 31(5): 415-417; 1978.

The survey of British laboratories in 1970-74 was continued by a questionnaire to members of the Association of Clinical Pathologists covering the next 2 yr. Only nine cases of hepatitis (3 of hepatitis B) were reported in a total of 223 laboratories. The annual attack rate of 34 per 100,000 was only one-fourth that reported in the previous 2 yr. No laboratory reported more than a single case, and an analysis of the characteristics and work patterns of the laboratories showed no special association with hepatitis. The dramatic fall in the attack rate of hepatitis since the previous study, and in particular of hepatitis B, suggests that the strenuous and expensive efforts in recent years to prevent laboratory-acquired hepatitis in Britain have had considerable success.

7123 HEPATITIS: THE PLIGHT OF THE CARRIER. (Eng.) Blumberg, B. S. (Univ. Pennsylvania, Philadelphia, PA). *Sciences* 8(3):10-11, 30; 1978.

The social consequences of the existence of simple routine tests for the detection of hepatitis B surface antigen (HBsAg) carriers are discussed. The carrier state is usually detected in an asymptomatic individual whose serum is tested for routine blood donation. The carrier is unique in that he is asymptomatic but may unwittingly cause illness in others. It is not known how many carriers can transmit hepatitis by means other than transfusion; although there are cases of this type, they appear to be rare. Some evidence has suggested that carriers who have evidence of ongoing liver disease or who have the e antigen are more likely to transmit the disease. Problems faced by health care personnel, Vietnam veterans, and orphaned Vietnamese children brought to the United States who are carriers are discussed. The value of taking measures to isolate these carriers is questioned: should one group of carriers be stigmatized while others are not, just because it is easy to unmask them?

7124 THE RISK OF HEPATITIS B TO HOSPITAL PERSONNEL: A PROSPECTIVE STUDY AMONG PERSONNEL EXPOSED TO PATIENTS WITHOUT ISOLATION PRECAUTION. (Eng.) Wickliffe, C. W.; Galambos, J. T.; Rivers, S.; Blitch, L. (Emory Univ. Sch. Medicine, 69 Butler St. S.E., Atlanta, GA 30303). *Am. J. Dig. Dis.* 23(4):293-296; 1978.

A study was undertaken to determine prospectively the probability of developing clinical or serological evidence of hepatitis B virus infection among ward personnel involved in the care of hepatitis B patients where no specific isolation precautions were in use other than separate collection of hypodermic needles and no parenteral exposure occurred. During a 2-week period, 54 ward personnel were exposed to 2 patients with severe type B hepatitis, one with fulminant hepatitis who died on the fifth hospital day and one with grade 2 encephalopathy who was on the ward for 10 days. Both patients were hepatitis B surface antigen (HBsAg)-positive. The 54 subjects were categorized by exposure to the 2 patients: group A, physcial contact with the index cases >3 times (n=15); group B, physical contact <3 times (n=15); group C, physical contact with containers of blood, feces, urine, or saliva from index cases (n=11); and group D, no physical contact, but on the ward with index cases (n=13). Clinically recognizable hepatitis did not develop among the 54 subjects during 22 weeks of follow-up; all remained negative for HBsAg. Two from group B and two from group D developed mild transient SGPT elevations; antibody to HBs (anti-HBs) was negative in all four subjects. Anti-HBs was demonstrated in 7/54 subjects (3 in group B, 1 in group C, and 3 in group D); 5/7 had been anti-HBs-positive initially (at 1 week), whereas 2 became positive later (at 3 and at 13 weeks). This study indicates that ward personnel who care for patients with type B hepatitis are not at an increased risk of infection when specific isolation procedures are not used.

7125 HEPATITIS B: ABSENCE OF TRANSMISSION BY GASTROINTESTINAL ENDOSCOPY. (Eng.) McClelland, D. B. L.; Burrell, C. J.; Tonkin, R. W.; Heading, R. C. (Royal Infirmary, Edinburgh, Scotland). *Br. Med. J.* 1(6104):23-24; 1978.

To evaluate the risk of transmitting hepatitis B via a contaminated endoscope, 37 of 38 patients examined with the same instrument after it was used to examine a man with persistent hepatitis B (HB) antigenemia were followed up. The index patient was HB surface antigen (HBsAg)- and HBeAg-positive at the time of his endoscopy, but the discovery was made too late to prevent the further use of the instrument for 15 days. Between examinations, the instrument was cleaned only with water, chlorhexidine, and cetrimide. Sera from 37 patients were obtained 2-104 days after endoscopy and were all HBsAg- and HBeAg-negative; 2 were positive for antibody to HBsAg (anti-HBs). Thirty patients were retested at 162-225 days with no antigenemia detected and no change in antibody titers found. Using an ^{125}I-HBsAg marker, contamination of instruments was simulated, and washing procedures usually employed were followed; it was possible to recover the marker from the instruments after the routine cleaning. The coiled outer cover of the forceps was a particularly important trap for contaminated material. Although the results suggest that this mode of transmission of HB is

rare, additional precautions are suggested for decontaminating instruments. Known HBsAg carriers should be examined with separate instruments for which there are separate precautions.

7126 A CASE OF HEPATITIS B WITH PLEURAL EFFUSION. (Eng.) Flacks, L. M.; Lees, D. (Rotorua Hosp., Rotorua, New Zealand). *Aust. N.Z. J. Med.* 7(6):636-637; 1977.

A case of viral hepatitis B with associated large pleural effusion is reported. The patient was a 26-yr-old man. Pleuritic pain and effusion developed on day 6 of his illness; jaundice was observed on day 9. Increased awareness of the association between viral hepatitis and pleural effusion seems to be of clinical importance and may contribute to knowledge of autoimmune phenomena and the part they play in the interrelationship of certain diseases.

7127 HEPATITIS IN HEMODIALYSIS PATIENTS: SIGNIFICANCE OF HBeAg. (Eng.) Miller, D. J.; Williams, A. E.; Le Bouvier, G. L.; Dwyer, J. M.; Grant, J.; Klatskin, G. (Yale Univ., Sch. Medicine, 333 Cedar St., New Haven, CT 06510). *Gastroenterology* 74(6):1208-1213; 1978.

Twenty-four hepatitis B surface antigen (HBsAg)-positive ($HBsAg^+$) hemodialysis patients were prospectively studied to assess (1) the prognostic value of hepatitis B e antigen (HBeAg) and its HBe_1Ag and HBe_2Ag components and (2) whether a difference in cellular immune status between $HBeAg^+$ and $HBeAg^-$ negative ($HBeAg^-$) patients could be defined. Sixteen patients were $HBeAg^+$ and eight were $HBeAg^-$ initially. After a mean follow-up period of 23.7 months, 15 of the 16 $HBeAg^+$ patients were still $HBsAg^+$ at death or last follow-up, whereas 7 of the 8 $HBeAg^-$ patients had become $HBsAg^-$ at a mean period of 3.8 months. This finding indicates that the initial presence of HBeAg correlates with HBsAg persistence. HBe_1Ag was consistently present in 15 of the 16 patients when HBeAg was detectable, whereas HBe_2Ag fluctuated widely in individual patients over time. No difference in cellular immune status between $HBeAg^+$ and $HBeAg^-$ patients could be defined; although both $HBeAg^+$ and $HBeAg^-$ patients had a similar decrease in peripheral blood thymus-derived cells and poor responsiveness to purified HBsAg, both groups of patients had stimulation indices to nonspecific mitogens within the normal range.

7128 CYTOMEGALOVIRUS HEPATITIS (DIAGNOSIS AND DIFFERENTIAL DIAGNOSIS). (Eng.) Groza, S. (Faculty Medicine, Univ. Belgrade, Belgrade, Yugoslavia). *Acta Hepatogastroenterol. (Stuttg.)* 24(5):340-343; 1978.

The diagnosis and differential diagnosis of cytomegalovirus (CMV) hepatitis is considered. A 12-yr-old girl presented with fever, nausea, and vomiting. Her sclerae were subicteric, the glands in her neck were mildly enlarged, and she had predominantly mononuclear cells in the peripheral blood. Biochemical analyses did not indicate hepatitis A. The patient's sclerae cleared on the third hospital day, and she became afebrile; there were no complications and the disease had a mild course. Histological analysis revealed viral hepatitis in an advanced stage. Virological examination of the patient's serum confirmed the CMV etiology of the disease. An accurate diagnosis could not have been made without the virological results.

7129 SERUM BILE ACIDS IN PATIENTS WITH VIRAL HEPATITIS. (Eng.) Pennington, C. R.; Ross, P. E.; Bouchier, I. A. D. (Ninewells Hosp. and Medical Sch., Dundee, Scotland). *Scand. J. Gastroenterol.* 13(1):77-80; 1978.

To evaluate the changes in the total and individual bile acids in patients with viral hepatitis, fasting blood samples were obtained from 18 patients when they were first seen. In 9/18 patients (group A) who were seen within 2 weeks of the onset of symptoms, fasting serum was also obtained at weekly intervals for 2 more weeks. In 8/18 patients (group B) postprandial serum bile acids were estimated during convalescence every 2 weeks until liver function tests had returned to normal. Total serum bile acid values for the 18 patients were 42.9-452 μM (normal maximum is 4.5 μM), which values correlated with the serum bilirubin levels ($r=0.63$, $p<0.005$) but not with the aspartate aminotransferase (AAT) levels. Cholic (C), chenodeoxycholic (CD), and deoxycholic (D) acids were the major bile acids in the 18 patients; their proportions were variable (e.g., C:CD was 0.19-1.91); D accounted for only 5.1% of the total compared to 26.1% in control subjects ($p<0.001$). In group A, the C:CD ratio tended to increase with time, as C replaced CD in predominance as the disease resolved. When compared to the levels of bilirubin, AAT, and γ-glutamyl-transpeptidase, the levels of postprandial serum bile acids returned to the normal range at varying times. It is concluded that the measurement of serum bile acids does not provide added information of value in the management of patients with viral hepatitis.

7130 SERUM MYOINOSITOL AND PHOSPHATIDYLINOSITOL IN PATIENTS WITH VIRAL HEPATITIS. (Pol.) Tkaczewski, W.; Tkacz, B.; Lutz, W.; Szeszko, A.; Dworniak, D.; Drobnik, S. (Instytut Medycyny Wewnetrznej WAM, ul. Kniaziewicza 1/5, 91-347 Lodz, Poland). *Pol. Tyg. Lek.* 32(49):1913-1915; 1977.

The serum concentrations of myoinositol, phosphatidylinositol, cholesterol, and total phospholipids as well as the serum alanine aminotransferase activity were determined in 17 patients with serum hepatitis during the 1st, 2nd, 3rd, and 4th weeks of the disease. The myoinositol levels were 51.6 ± 10.7 μM during the 1st week ($p<0.001$) and 34.9 ± 8.2 μM during the 2nd week ($p<0.02$) versus a normal value of 21.5 ± 5.5 μM. There was no significant difference during the 3rd and 4th

weeks. The phosphatidylinositol levels were 126 ± 21 μM during the 1st week ($p<0.001$), 153 ± 24 μM ($p<0.001$) during the 2nd week, 186 ± 35 μM ($p<0.005$) during the 3rd week, and 199 ± 36 μM ($p<0.01$) during the 4th week, compared with a normal level of 255 ± 42 μM. The cholesterol and total phospholipid levels did not show any significant change from the respective normal values. The alanine aminotransferase activity dropped sharply from the 1st to the 4th week.

7131 SEROCONVERSION FROM HEPATITIS B e ANTIGEN TO ANTI-HBe IN ACUTE HEPATITIS B VIRUS INFECTION. (Eng.) Aikawa, T.; Sairenji, H.; Furuta, S.; Kiyosawa, K.; Shikata, T.; Imai, M.; *et al.* (Mito Natl. Hosp., Ibaraki-ken, Tokyo, Japan). *N. Engl. J. Med.* 298(8):439-441; 1978.

To study the temporal course of hepatitis B e antigen (HBeAg) and antibody to it (anti-HBe), a recently developed sensitive passive hemagglutination assay was used to investigate sera from persons at high risk of HB infection and from a chimpanzee with experimental HB infection. HB was diagnosed in seven members of the medical staffs of two laboratories conducting research with HB virus, and a chimpanzee was inoculated with 0.1 μl of pooled plasma from HB carriers containing both HBeAg-associated and HB surface Ag (HBsAg)-associated DNA polymerase activity. HBeAg was present (titer 2^3-2^{10}) in all sera as long as HBsAg was present. After recovery from hepatitis, anti-HBe developed in the sera of three patients and of the chimpanzee but was not found in the remaining sera during 10 weeks of follow-up. Antibody to HBsAg (anti-HBs) developed in six patients and the chimpanzee; antibody to HB core antigen (anti-HBc) developed in all sera. All subtypes of HBsAg were present and bore no relation to the appearance of HBeAg. The time courses for the antigens and antibodies in one patient and the chimpanzee are given. It is possible that the seroconversion to anti-HBe could have occurred at a level below the lower limit of the detection method in the four patients not found to become anti-HBe-positive. However, seroconversion to anti-HBe does occur in acute HB infection.

7132 IgA DYSGAMMAGLOBULINEMIA IN LIVER DISEASES. (Cze.) Svejda, J.; Richter, J. (Infekcni oddeleni, Krajska nemocnice s poliklinikou KUNZ, tr. SNP 18, 400 11 Usti nad Labem, Czechoslovakia). *Cas. Lek. Cesk.* 117(4):111-114; 1978.

Various dysgammaglobulinemias were found in 28/282 patients with viral hepatitis and diseases of the gallbladder and bile ducts. IgG dysgammaglobulinemia was found in one patient with hepatitis A and another with hepatitis B. IgA dysgammaglobulinemia was found in two patients with hepatitis A and in two patients with hepatitis B. IgM dysgammaglobulinemia was found in 2 patients with hepatitis A, in 9 patients with hepatitis B, and in 10 patients with diseases of the gallbladder and bile ducts. IgG paraprotein was found in one patient with hepatitis B. The IgA levels were 0.004-0.370 IU/ml in three of the four patients with IgA dysgammaglobulinemia 12-24 months after viral hepatitis and were absent in the fourth patient. The conspicuously high incidence of dysgammaglobulinemias is interpreted as a sign of predisposition among patients with this condition to viral hepatitis and diseases of the gallbladder and bile ducts.

7133 HEPATITIS IN EARLY SYPHILIS: REPORT OF THREE CASES. (Eng.) McMillan, A.; Anderson, J. R.; Robertson, D. H. H. (Royal Infirmary, Edinburgh EH3 9YW, Scotland). *Br. J. Vener. Dis.* 53(5):295-298; 1977.

The cases of three patients with early syphilis and liver dysfunction, none of whom was known to have had contact with hepatitis, are presented. Two patients had had several homosexual contacts, but neither hepatitis B antigen nor antibody was detected in their sera. The first patient, a 38-yr-old man, presented with pruritus, nausea, dark urine, and scleral icterus. He had been examined 2 months earlier for syphilis, but his Venereal Diseases Research Laboratory (VDRL) and *Treponema pallidum* hemagglutination (TPHA) tests were negative. The patient had abnormal liver function tests and hepatomegaly. There was no evidence of a healed primary lesion or a rash, but the VDRL titer was positive at 1:8, and the TPHA titer was positive at 1:80; the fluorescent treponemal antibody absorption (FTA-ABS) test was also positive. Four days later, he developed a maculopapular rash. One week following the start of penicillin therapy, the rash faded, and the jaundice disappeared after 2 weeks. The second patient presented with typical condylomata lata in the perianal region and a papulosquamous rash but no evidence of a healed primary lesion. Tests for syphilis were positive. He was not jaundiced, but the liver enzymes were elevated. The liver function tests began to normalize 14 days after starting penicillin therapy and were normal 6 weeks later. The third patient, a 46-yr-old man, had a penile ulcer, no evidence of jaundice or mucocutaneous lesions of secondary syphilis, and no hepatomegaly. The liver function tests were abnormal. The patient was asymptomatic and liver function tests were normal 8 weeks after penicillin therapy. These cases emphasize the need to exclude syphilis when the liver function tests of a jaundiced patient do not conform to any well-defined pattern.

7134 HEPATITIS B IS NOT TRANSMITTED BY ORAL-FECAL ROUTE. (Fre.) Piazza, M.; Cacciatore, L.; Molinari, V.; Picciotto, L. (Faculty Medicine, Univ. Naples, via S. Pansini, Naples, Italy). *Nouv. Presse Med.* 6(29):2606-2607; 1977.

7135 PROGNOSTIC VALUE OF ISOENZYMES IN ACUTE HEPATITIS: LOADING TESTS. (Ger.) Baumgarten, R.; Klimmt, G.; Graubaum, H. J.; Wagenknecht, C. (Stadtisches Krankenhaus Prenzlauer Berg, Nordmarkstrasse 15, DDR-1055 Berlin, E. Germany). *Z. Gesamte Inn. Med.* 32(3):43-45; 1977.

7136 IMMUNOLOGICAL ASPECTS OF VIRAL HEPATITIS. (Ger.) Meyer zum Buschenfelde, K. H.; Arnold, W.; Hutteroth, T. H. (Klinikum Charlottenburg der Freien Universitat, Spandauer Damm 130, D-1000 Berlin 19, W. Germany). *Internist (Berlin)* 18(4):201-207; 1977.

7137 SERUM IMMUNOGLOBULIN LEVELS IN CHILDREN WITH VIRAL HEPATITIS. (Rus.) Makhmudova, O. S.; Mukhamedov, D. B. (Central Asiatic Inst. Pediatric Medicine, Tashkent, USSR). *Zh. Mikrobiol. Epidemiol. Immunobiol.* (8):140-141; 1977.

7138 COMPARATIVE STUDY OF ALPHA-FETOPROTEIN AND AUSTRALIA ANTIGEN IN VIRAL AND SERUM HEPATITIS IN YOUNG CHILDREN. (Rus.) Silishcheva, N. N.; Krivonosov, S. K.; Masenko, V. P.; Tatarinov, Iu. S. (Dept. Pediatrics, Astrakhan' Medical Inst., Astrakhan', USSR). *Pediatriia* (7):76-77; 1977.

7139 SEROLOGICAL SUBGROUPS OF HEPATITIS B SURFACE ANTIGEN (AUSTRALIA ANTIGEN) AND THEIR SIGNIFICANCE. (Hun.) Halmosdi, G.; Vallo, D.; Matkovics, A. (Vertransfusios Osztaly, Orvostovabbkepzo Intezet, Budapest, Hungary). *Orv. Hetil.* 118(36):2139-2143; 1977.

7140 SERUM DIGOXIN CONCENTRATION IN ACUTE HEPATITIS. (Hun.) Somogyi, G.; Gasztonyi, G.; Gachalyi, B.; Ibranyi, E. (II. Belgyogyaszati Klinika, Semmelweis Orvostudomanyi Egyetem, Budapest, Hungary). *Orv. Hetil.* 119(3):131-132; 1978.

7141 THERAPEUTIC RESULTS WITH HEPSAN® IN SELECTED FORMS OF HEPATITIS. (Ger.) Schneider-Reinkens, A. (Homburger Landstrasse 112, D-6000 Frankfurt a. M. 50, W. Germany). *Munch. Med. Wochenschr.* 119(25):869-870; 1977.

7142 REPARATIVE PROCESSES IN THE LIVER IN VIRAL HEPATITIS. (Rus.) Kartashova, O. Ia; Saldava, L. A.; Zaltsmane, V. I.; Vandans, Ia. A. (Hepatology Center, Latvian SSR Ministry Public Health, Riga, USSR). *Arkh. Patol.* 38(8): 26-32; 1976.

7143 HEPATITIS B AND LIVER CANCER. (Fre.) Sankale, M. (Faculte de Medecine et de Pharmacie de Dakar, Dakar, Senegal). *Bull. Acad. Natl. Med. (Paris)* 161(6):492-495; 1977.

See also, 6780, 6978, 7067, 7152, 7193.

LIVER AND BILIARY TRACT

Chronic Hepatitis

7144 ISOENZYMES OF ASPARTATE AMINOTRANSFERASE IN CHRONIC LIVER DISEASES. (Eng.) Skrha, J.; Stepan, J.; Volek, V. (Faculty Medicine, Charles Univ., U nemocnice 1, 128 21 Prague 2, Czechoslovakia). *Acta Hepatogastroenterol. (Stuttg.)* 25 (2):127-129; 1978.

To evaluate the importance of aspartate amino transferase (AST) isoenzymes (cytoplasmic and mitochondrial) in liver diseases, the plasma levels of these isoenzymes were studied in 27 patients with chronic hepatitis, 23 with liver cirrhosis, 6 with focal liver tumors, and in 34 healthy controls. The patients were further divided as having biochemically active hepatitis (9) or cirrhosis (18) or stabilized hepatitis (12) or cirrhosis (6). The patients with active hepatitis or cirrhosis and with neoplasms had significantly higher total AST activity, cytoplasmic AST isozyme activity, and mitochondrial AST isoenzyme activity as compared with controls ($p < 0.005$), whereas those with stabilized hepatitis or cirrhosis had AST values similar to those of controls. In particular, the mitochondrial AST levels in patients with neoplasms were markedly elevated. These results indicate the usefulness of mitochondrial AST determinations in estimating the depth of structural liver damage and the stability of a liver disease process.

7145 EFFECT OF VIDARABINE ON CHRONIC HEPATITIS B VIRUS INFECTION. (Eng.) Pollard, R. B.; Smith, J. L.; Neal, E. A.; Gregory, P. B.; Mer-

igan, T. C.; Robinson, W. S. (Stanford Univ. Medical Center, Stanford, CA 94305). *JAMA* 239(16):1648-1650; 1978.

To evaluate the effect of vidarabine (adenosine arabinoside) on Dane particle markers in hepatitis B virus (HBV) infection, two patients with chronic hepatitis and HBV infection were studied. Both patients received two courses of vidarabine of 15 mg/kg/day for 9-14 days separated by an interval of 7 weeks in one patient and 20 days in the other. In the first patient, Dane particle DNA polymerase activity decreased markedly during each course and rose sharply when vidarabine therapy was stopped; in the second patient, the DNA polymerase activity fell to undetectable levels by day 8 of course one, rose somewhat in the interval, then fell again to undetectable levels during the second course and has remained undetectable for 12 months. No significant change occurred in the hepatitis B surface antigen (HBsAg) complement fixation titer in the first patient, but in the second patient, the titer fell from 1:256 to <1:8 and remained at this level for 12 months after therapy. The hepatitis B core antigen (HBcAg) level was transiently decreased in the first patient but became undetectable in the second patient after the second course. Mild transient suppression of granulocytes, reticulocytes, and platelets occurred in both patients during therapy. The first patient experienced nausea, anorexia, and constipation. The second patient had mild abdominal cramping during the first course of treatment that recurred with nausea and more notable cramping pain during the second course; since the patient was an insulin-dependent diabetic with autonomic neuropathy, the relative contribution of vidarabine to her signs and symptoms is uncertain. No consistent changes in liver function tests were observed in either patient. The reason for the differential response of the two patients is unknown. The results suggest that the replication of HBV may be inhibited by vidarabine, but the side-effects of this drug indicate that further study is required before it is used in therapy for HBV infection.

7146 PROGNOSTIC VALUE OF HBeAg IN CHRONIC PERSISTENT HEPATITIS. (Eng.) Pastore, G.; Dentico, P.; Fera, G.; Schiraldi, O. (Clinica Malattie Infettive Universita di Bari, Policlinico, 70124 Bari, Italy). *Br. Med. J.* 2(6101):1521; 1977.

The relationship between the hepatitis B e antigen/antibody (HBeAg/anti-HBe) system and the prognosis was studied in 35 patients with hepatitis B surface antigen (HBsAg) and antibody (anti-HBs)-positive chronic progressive hepatitis. Twelve patients, four of whom carried anti-HBe and two HBeAg, showed biochemical and histological resolution of liver disease over 12 months. The two patients with HBeAg lost the antigen after 6 and 7 months, resp. Fifteen patients showed no change during a mean of 24 months' observation. Five were anti-HBe carriers and six were HBeAg carriers. Only two of these six lost their initial HBeAg positivity despite persistence of HBsAg. Eight patients developed chronic aggressive hepatitis (6 cases) or cirrhosis (2) within 6 months to 3 yr. All eight had HBeAg in their serum, and only one showed seroconversion of HBeAg positivity. These data suggest that the loss of HBeAg in chronic progressive hepatitis may be an important prognostic sign indicating resolution of the illness. Persistence of HBeAg may be associated with an impaired immune response to the hepatitis B virus.

7147 CHRONIC ACTIVE HEPATITIS AND MEMBRANEOUS GLOMERULONEPHRITIS. (Eng.) Cogan, M. C.; Graber, M. L.; Connor, D. G. (Dept. Medicine, 1065 HSE, Univ. Southern California, San Francisco, CA 94143). *Am. J. Gastroenterol.* 68(4):386-391; 1977.

The case of a 26-yr-old man with hepatitis B surface antigen (HBsAg) in his serum for 5 yr who developed the nephrotic syndrome is presented. He was referred for evaluation due to increasing edema. His SGOT and SGPT were elevated (150 mU/ml and 62 mU/ml, resp.), the 24-hr urinary protein excretion was 3 g of which 77% was albumin, and the serum albumin was 2.8 g%. A percutaneous renal biopsy showed classic changes of membraneous glomerulonephritis (GN) with basement membrane thickening and "spikes" on silver methenamine staining. Electron microscopy showed large intramembraneous electron-dense deposits and podocyte "fusion." Immunofluorescent examination revealed a granular distribution of IgG and complement component C3 in the glomeruli and IgA in the interstitium. Indirect immunofluorescence showed HBsAg in a granular distribution in the glomeruli. A liver biopsy showed chronic active hepatitis (CAH) with widening of the portal tracts by mononuclear cell infiltrates, piecemeal necrosis of limiting plates, and focal bridging without cirrhosis. Prednisone therapy (100-120 mg every other day) brought the SGOT to 50 mU/ml after 4 months, but the hypoalbuminemia and proteinuria remained. The finding of HBsAg deposition in the glomerulus supports the pathogenic relation of the antigenemia to the renal disease.

7148 A CASE OF CHRONIC ACTIVE HEPATITIS WITH ANTIMICROSOMAL AND ANTINUCLEAR ANTIBODIES. (Ita.) Marchesini, G.; Masi, M.; Paolucci, P.; Franceschi, C.; Perocco, P.; Zauli, D. (Universita di Bologna, Istituto di Patologia Speciale Medica, Bologna, Italy). *Minerva Pediatr.* 29(12):827-832; 1977.

7149 ANTI-MEASLES AND ANTI-RUBELLA HEMAGGLUTINATION INHIBITING ANTIBODIES IN A GROUP OF CHILDREN WITH CHRONIC HEPATITIS. (Ita.) Jannuzzi, C.; Campelli, A.; Fabbri, A. (II Cattedra di Malattie Infettive dell'Universita, Via 5 Maggio, 39-16145 Genoa, Italy). *Boll. Ist. Sieroter. Milan.* 55(6):519-523; 1976.

7150 BIOCHEMICAL INVESTIGATION OF THE BILE IN CHRONIC HEPATITIS AND LIVER CIRRHOSIS. (Rus.) Ivanov, A. I.; Radchenko, V. G. (Second Dept. Therapy, S. M. Kirov Military Medical Acad., Leningrad, USSR). *Ter. Arkh.* 49(2):60-64; 1977.

See also, 7067, 7121, 7141, 7160, 7162.

LIVER AND BILIARY TRACT

Alcoholic Liver Disease

7151 EPIDEMIOLOGICAL ASPECTS OF ALCOHOLIC LIVER CIRRHOSIS IN MEXICO. (Spa.) Dajer, F.; Guevara, L.; Arosamena, L.; Suarez, G. I.; Kershenobich, D. (Instituto Nacional de la Nutricion, Av San Fernando y Viaducto Tlalpan, Mexico 22, D.F., Mexico). *Rev. Invest. Clin.* 30(1):13-28; 1978.

The epidemiology of alcoholic liver cirrhosis was studied in Mexico in a series of 2,394 cirrhotic patients during the period 1947-1975. Alcoholic liver cirrhosis was diagnosed in 55.7% of the patients, posthepatitic cirrhosis in 36.6%, cryptogenic cirrhosis in 5.8%, and other forms of cirrhosis in 1.9%. Men accounted for 93.75% of the patients with alcoholic liver cirrhosis. Nearly 80% of the patients had the first clinical manifestation of cirrhosis between the ages of 31 and 60 yr; alcoholic liver cirrhosis was diagnosed during the first year after the onset of the symptoms in 59.8% of the patients. The age at which the patients started drinking ranged from 3 to 63 yr. Seventy-eight percent of the patients were heavy daily drinkers. The alcohol was generally consumed directly with meals. The 1-yr and 5-yr survival rates were 73.7% and 55.8%, resp. Hepatic insufficiency directly related to alcoholic liver cirrhosis and/or its complications, including hepatic coma and acute anemia due to hemorrhage from the digestive tract, was the cause of 88% of all deaths.

7152 HIGH PREVALENCE OF HEPATITIS B VIRUS INFECTION AMONG HEAVY ALCOHOL DRINKERS IN JAPAN. (Eng.) Naito, K.; Tsuji, T.; Nozaki, H.; Nagashima, H. (Okayama Univ. Medical Sch., 2-5-1 Shikata-cho, Okayama 700, Japan). *Microbiol. Immunol.* 21(12):735-738; 1978.

To clarify the pathogenesis of cirrhosis and chronic hepatitis in alcoholics, the prevalence of hepatitis B surface antigen (HBsAg), antibody to HBsAg (anti-HBs), and antibody to hepatitis B core antigen (anti-HBc) was examined in the sera of inhabitants of a district of Japan where alcohol drinking is popular and in controls. A group of 695 individuals from one city included 21 alcoholics (intake of >80 g ethanol/day for ≥5 yr), 421 nondrinkers, and 253 children (ages 3-12 yr). In addition, 675 individuals from a different city and 42,588 blood donors from this region were also studied. The frequency of HBsAg carriers did not differ significantly among these groups. The frequency of anti-HBs was 42.9% in the alcoholics, 21.1% in the nondrinkers, 5.1% in the children, 18.1% in the group from a different city, and 14.3% among 200 randomly selected blood donors from the larger group; the alcoholics differed significantly ($p<0.05$) from all the control groups. The alcoholics were 71.4% anti-HBc-positive, a rate significantly different ($p<0.05$) from the rates among the nondrinkers (43.0%), children (11.1%), or 200 blood donors (28.6%). The alcoholics also differed significantly ($p<0.05$) with respect to SGPT values. Alcoholics may be more accessible to hepatitis B virus (HBV), either through direct contact with infected individuals or because of impaired immunity. Alternatively, HBV may persist in minute quantities in the bodies of alcoholics, leading to increased antibody synthesis. It may also be that reinfection by HBV among alcoholics has a booster effect on antibody production. HBV appears to be closely related to the progression from alcoholic liver injury to cirrhosis.

7153 MITOCHONDRIAL ENZYME ACTIVITIES IN LIVER BIOPSIES FROM PATIENTS WITH ALCOHOLIC LIVER DISEASE. (Eng.) Jenkins, W. J.; Peters, T. J. (Royal Postgraduate Medical Sch., London W12 OHS, England). *Gut* 19(5):341-344; 1978.

The hypothesis that mitochondrial damage is a significant factor in the pathogenesis of alcoholic liver disease (ALD) was investigated by enzymic analysis of mitochondrial fractions isolated from needle biopsy specimens from 13 control patients, 14 patients with fatty liver due to chronic alcoholism, and from 6 patients with other forms of liver disease. Enzymes associated with the inner and outer mitochondrial membranes (monoamine oxidase, succinic dehydrogenase, and cytochrome c oxidase) showed normal levels in ALD. Enzymes associated with the mitochondrial matrix (glutamate dehydrogenase, malate dehydrogenase, and aspartate aminotransferase) showed significantly raised levels in ALD compared with those in normal controls ($p<0.01$, $p<0.05$, and $p<0.02$, resp.), but the levels in patients with nonalcoholic liver disease were nor-

mal. In addition, analysis of the mitochondria by sucrose density gradient centrifugation revealed no differences between control tissue and liver from patients with alcoholic liver disease. These results do not indicate that there is significant mitochondrial damage in ALD. The raised levels of mitochondrial matrix enzymes may represent an adaptive response to the ethanol load.

7154 STUDY OF PLASMA RENIN ACTIVITY DURING THE REINJECTION OF CONCENTRATED ASCITES IN CIRRHOSIS [Abstract]. (Fre.) Hueber, D.; Levy, V. G. (Hopital Saint-Antoine, Paris, France). *Gastroenterol. Clin. Biol.* 1(8/9):712; 1977.

7155 ZIEVE'S SYNDROME. (Fle.) Rutgeerts, P.; De Baere, H.; Hendrikx, A.; Fevery, J. (A.Z. St.-Rafael, Leuven, Belgium). *Tijdschr. Gastroenterol.* 19(2):136-148; 1976.

7156 INEFFECTIVENESS OF PREDNISOLONE IN THE TREATMENT OF SERIOUS FORMS OF ACUTE ALCOHOLIC HEPATITIS [Abstract]. (Fre.) Bories, P.; Lebrec, D.; Rueff, B.; Benhamou, J. P. (Hopital Beaujon, F 92110 Clichy, France). *Gastroenterol. Clin. Biol.* 1(8/9):706-707; 1977.

7157 BEER DRINKER'S CARDIOMYOPATHY: LIVER FAILURE, HYPONATRAEMIA, HYPO-OSMOLALITY, INAPPROPRIATE SECRETION OF ANTIDIURETIC HORMONE, LACTIC ACIDOSIS, VENOUS GANGRENE AND MYONEUROPATHY. (Eng.) Karthigasu, M. (New Cross Hosp., Wolverhampton WV10 0QP, England). *Proc. R. Soc. Med.* 70(8): 544-548; 1977.

See also, 6726, 6818, 6922, 7091, 7162.

LIVER AND BILIARY TRACT

Cirrhosis

7158 TESTOSTERONE IN THE MANAGEMENT OF CIRRHOSIS OF THE LIVER--A CONTROLLED STUDY. (Eng.) Puliyel, M. M.; Vyas, G. P.; Mehta, G. S. (Benziger Hosp., Quilon 691001, India). *Aust. N.Z. J. Med.* 7(6):596-599; 1977.

To improve the treatment of cirrhosis of the liver, a controlled trial of testosterone therapy was carried out in 21 patients randomly assigned to a control group (group I) and a testosterone group (group II). Group I and group II received frusemide (40 mg i.v. daily for 3 days and then daily with KCl supplements); group II also received testosterone (100 mg parenterally on alternate days for 4 weeks, then 300 mg fortnightly). All 31 patients had histologically confirmed portal cirrhosis; in group I, 4 had postnecrotic cirrhosis and 5 had nutritional cirrhosis; in group II, 6 patients each had postnecrotic or nutritional cirrhosis. At the end of 4 weeks, there was a minimum reduction of 2.5 cm in the size of the spleen and an average reduction of 2.5 kg in weight in group II, whereas in group I, average weight increased by 2.6 kg. Abdominal girth showed a mean decrease of 4.8 cm in group II and a mean increase of 4.7 cm in group I. Total serum protein rose 8.8% in group II but only 1.7% in group I; serum albumin rose 34.6% in group II but fell 12.5% in group I ($p<0.05$); serum globulin fell 12.5% in group II but rose 14.7% in group I ($p<0.05$). The value of thymol turbidity showed some deterioration in group I patients but showed a significant ($p<0.01$) improvement in group II cases. An increased appetite was reported by 75% of group II patients but by only 11% of group I patients. No histologic changes were observed over the course of the study when initial and final needle biopsies were compared. The adverse side-effects were noted in patients of either sex. These results confirm those in other studies concerning the value of testosterone therapy for liver cirrhosis.

7159 PLASMAPERFUSION FOR THE TREATMENT OF INTRACTABLE PRURITUS OF CHOLESTASIS. (Eng.) Lauterburg, B. H.; Pineda, A. A.; Dickson, E. R.; Baldus, W. P.; Taswell, H. F. (Mayo Graduate Sch. Medicine, Rochester, MN). *Mayo Clin. Proc.* 53(5): 403-407; 1978.

The case of a patient with primary biliary cirrhosis and intractable pruritus who was treated with plasmaperfusion of charcoal-coated glass beads on two occasions is presented. The procedures were well tolerated and resulted in the removal of about 70% (494 μmol) of the estimated chenic acid pool. There was pronounced amelioration of the pruritus, which enabled the patient to sleep through the night without awakening because of itching. The pruritus,

however, did not disappear and gradually returned to its preperfusion intensity by the end of the third week after perfusion. This case demonstrates that plasmaperfusion of charcoal-coated glass beads is a safe technique that effectively removes bile acids and bilirubin.

7160 ON THE POSSIBLE RELATIONSHIP BETWEEN PLASMA CEA AND THE SEVERITY OF CIRRHOSIS. (Eng.) Mor, C.; Gamba, G.; Moro, E.; Gennari, L.; Orefice, S.; Rocco, P.; *et al.* (Ospedale "S. Marta," Rivolta d'Adda, CR, Italy). *Rend. Gastroenterol.* 9(2):118-121; 1977.

Two hundred eight patients with non-neoplastic liver diseases were studied to determine if there is a relationship between the presence of carcinoembryonic antigen (CEA) and various humoral indices characterizing liver diseases and to ascertain whether the frequency of positive results is correlated with the severity of the disease. Radioimmunoassay for CEA gave positive results in 6 of the 29 patients with steatosis, in 10 of the 27 with chronic hepatitis, in 30 of the 84 with cirrhosis, in 1 of the 57 with biliary lithiasis, and in 9 of the 11 with acute hepatitis. In the cirrhotic patients, there was a significant correlation ($0.05< p<0.01$) between CEA-positive sera and several abnormal hematochemical indices (albumin, α_2-globulin, γ-globulin, indirect bilirubin, direct bilirubin, and prothrombin activity levels). The results suggest that a positive CEA test in cirrhosis is directly related to the severity of the disease.

7161 ALTERATION OF HAEM SYNTHESIS IN CIRRHOSIS OF THE LIVER. (Eng.) Kautzsch, E. (Medizinische Abteilung im Stadtischen Krankenhaus, Oberfohringerstr. 156, D-8000 Munchen-Oberfohring 81, W. Germany). *Acta Hepatogastroenterol. (Stuttg.)* 25(2):124-126; 1978.

To clarify disturbances of heme synthesis that occur in hepatic disorders, the levels of free protoporphyrins in RBC (EPP) were examined in 51 patients with liver cirrhosis (LC) and compared with values in 16 normal subjects, 14 patients with chronic fibrotic hepatitis (CFH), and 5 patients with chronic aggressive hepatitis. The LC patients fell into two groups. Group A (29 patients) had EPP values averaging close to the normal value (16.5 $\mu g/10^{11}$ RBC and 26.7 $\mu g/10^{11}$ RBC for group A and normals, resp.), whereas group B had markedly elevated EPP levels (44.2 $\mu g/10^{11}$ RBC) compared with normals. No relationship between EPP level and serum levels of SGOT, SGPT, bilirubin, iron, or protein was found in group A or B. The only consistent relationship was found between fat deposits in hepatocytes and EPP levels: a high level of one was always connected with a high level of the other. EPP levels in patients with CFH and CAH were 29.6 and 28.8 $\mu g/10^{11}$ RBC, resp. The increase in EPP level in LC may be due to a stimulating effect of a 5β-H-steroid metabolite on heme formation in the bone marrow or steroid metabolites involved in a feedback control mechanism may remain in the blood longer than is normal.

7162 IMMUNE COMPLEXES IN ACUTE AND CHRONIC LIVER DISEASE. (Eng.) Thomas, H. C.; De Villiers, D.; Potter, B.; Hodgson, H.; Jain, S.; Jewell, D. P.; *et al.* (Royal Free Hosp., Pond St., Hampstead, London, England). *Clin. Exp. Immunol.* 31(2):150-157; 1978.

Sera from patients with acute type A and B viral hepatitis, paracetamol-induced necrosis, hepatitis B surface antigen (HBsAg)-positive and -negative chronic active and persistent hepatitis, various types of alcohol-induced liver injury, and primary biliary cirrhosis were examined for the presence of immune complexes, to investigate the possibility that the complexes found in HBsAg-negative chronic active hepatitis may result from liver damage and may also be present in other liver diseases. In acute type A hepatitis, a large increase in complement component C1q binding was demonstrated during the period of elevated levels of transaminases. In type B hepatitis, the initial peak was small but was followed by a further peak during the period of falling serum HBsAg. In both diseases, the C1q binding was associated with >20S particles. In paracetamol-induced necrosis, C1q binding remained normal. In type A and B hepatitis and in paracetamol-induced necrosis, C4, C3, and factor B concentrations were depressed in the early phase of the disease. This change may reflect either diminished synthesis or increased catabolism. In HBsAg-positive and -negative chronic active hepatitis and in alcohol-induced disease, there was a significant correlation between C1q binding and the severity of hepatitis. C1q binding and anticomplementary activity were also increased in primary biliary cirrhosis. Density gradient studies indicated that the C1q binding activity in these subjects lies in the 8-14S and >19S particle-containing fractions. These findings suggest the presence of immune complexes in patients with acute and chronic liver disease. In some cases, the complexes may contain hepatitis viral antigens, but in alcohol-induced and autoimmune disease, other types of complex formation must exist. The accumulation of large and small complexes in subjects with liver disease may be a reflection of an impaired function of the mononuclear phagocytes. The potential of these complexes to activate complement will determine their pathological importance, and in this respect, those found in primary biliary cirrhosis may have special significance.

7163 EVALUATION OF VOLATILE SULFUR COMPOUNDS IN THE EXPIRED ALVEOLAR GAS IN PATIENTS WITH LIVER CIRRHOSIS. (Eng.) Kaji, H.; Hisamura, M.; Saito, N.; Murao, M. (Hokkaido Univ. Sch. Medicine, Nishi-7, Kita-15, Kita-ku, Sapporo 060, Japan). *Clin. Chim. Acta* 85(3):279-284; 1978.

To confirm the implication of methyl mercaptan and dimethyl sulfide reported in fetor hepaticus,

fasting levels of these sulfur-containing compounds were determined by gas chromatography in the expired alveolar gas in 53 normal subjects, 13 patients with acute hepatitis, 11 patients with chronic hepatitis, 20 patients with liver cirrhosis, and 19 patients with stomach ulcer and/or undergoing gastric mucosal biopsy. The fasting level of dimethyl sulfide in the cirrhotics was 4.05 ± 1.06 ng/dl, which was a significant elevation in comparison with that in normal controls (1.54 ± 0.09 ng/dl, $p<0.05$). The dimethyl sulfide level in the cirrhotics was also significantly elevated in comparison with the levels in patients with acute hepatitis ($p<0.05$) and patients with ulcer and/or biopsy ($p<0.05$). In contrast, the methyl mercaptan levels were similar in all groups. Since there was no significant increase in sulfur-containing compounds in the patients with ulcer and/or biopsy, it appears that these compounds do not originate from gastrointestinal bleeding and are not produced by the activity of gastrointestinal microflora from sulfur-containing substrates. The physiological significance of these compounds in normal and pathologic states must be further studied.

7164 ABNORMAL VITAMIN D METABOLISM IN CIRRHOSIS. (Eng.) Jung, R. T.; Davie, M.; Hunter, J. O.; Chalmers, T. M.; Lawson, D. E. M. (Dunn Nutrition Lab. [MRC], Milton Rd., Cambridge, CB4 1XJ, England). *Gut* 19(4):290-293; 1978.

To determine why low plasma 25-hydroxycholecalciferol (25 OHD) values are found in liver cirrhosis, vitamin D metabolism was investigated in 10 cirrhotic patients. The mean plasma 25 OHD concentration in alcoholic cirrhosis was lower than that in normal controls studied at the same time of year (winter, 8.7 ± 3.99 versus 10.4 ± 3.8 ng/ml), but the difference was not significant. In three of four patients restudied in late summer, plasma 25 OHD had risen. In contrast to the finding in normal subjects, the half-life of i.v. administered ^{3}H-cholecalciferol was short in cirrhotics and showed no correlation with plasma 25 OHD ($r=0.23$, p=NS), whereas half-life and plasma level of 25 OHD were correlated in controls ($r=0.78$, $p<0.01$). Furthermore, the appearance of ^{3}H-25 OHD from ^{3}H-cholecalciferol was reduced compared to the control group 4 hr after injection. An increased rate of cholecalciferol metabolism and deficient production of 25 OHD contribute to vitamin D deficiency in liver disease.

7165 THE PORTAL TRIAD IN HEPATIC CIRRHOSIS. (Eng.) Witte, C. L.; Witte, M. H.; Dumont, A. E. (Univ. Arizona Coll. Medicine, Tucson, AZ). *Surg. Gynecol. Obstet.* 146(6):965-974; 1978.

To shed light on the triad of ascites, rupture of esophageal varices, and congestive splenomegaly in patients with cirrhosis, the origin and treatment of this portal triad and its relation to portal hypertension are reviewed. Because critical events unfold in the relatively inaccessible hepatosplanchnic bed, methodology has been a major stumbling block to obtaining detailed hemodynamic and lymphodynamic data. Direct measurement of organ blood flow usually is made under artificial or less than ideal conditions, for example, at laparotomy, quantitation of portasystemic collateral venous flow is indirect and at best a rough approximation; examination of lymph flow and composition in the thoracic duct and its major tributaries in the liver and extrahepatic portal bed is limited. However, a more comprehensive understanding of these phenomena is slowly emerging. Ascites begins with an imbalance of physiochemical forces at the capillary level in the liver and digestive tract. Large amounts of fluid are driven out of the vascular space into splanchnic tissues. When the rate of lymph return to the systemic venous circulation fails to keep pace with excessive capillary filtration, ascites appears. This situation leads to salt and water retention, involving the renin-aldosterone system. Plasma volume is restored, but at the same time hepatosplanchnic lymph formation is further enhanced, and a vicious circle is created. Treatment depends upon reduction of lymph formation by indirect, dietary restriction of salt and water and by diuretic drugs or by direct, portasystemic shunt, portal decompression or alternatively, upon acceleration of already rapid lymph return, by lymphvenous or peritoneovenous shunt, to match the high rate of lymph production. Spontaneous rupture of esophagogastric varices develops because of the precipitous rise in portal pressure when increased splanchnic blood flow combines with progressively rising portal vascular resistance. The greater the restriction to transhepatic portal venous flow, the less of an increment in splanchnic blood flow is required to generate pressures that ultimately exceed the bursting tension of thin-walled varices. Treatment is based on attempts to lower resistance to esophagogastric venous flow. Splenomegaly in patients with liver disease primarily derives from hepatocellular dysfunction with compensatory reticuloendothelial hyperactivity in the congested spleen. Splenic arterial flow increases as the demand for blood flow rises from splenic work hypertrophy, and peripheral cytopenias may develop. Treatment of symptomatic hypersplenism requires reduction of splenic mass either by restricting splenic arterial inflow or ablating the spleen.

7166 MANAGEMENT OF HEPATIC ASCITES. (Eng.) Anonymous. (No affiliation given). *Lancet* 1(8059):311-312; 1978.

The management of hepatic ascites is reviewed. Reduction of serum colloid osmotic pressure (related to defective hepatic albumin synthesis) combined with portal hypertension due to obstruction are the principal causes. Intrasinusoidal pressure rises and causes hepatic lymph overproduction, and the kidney attempts to compensate for fluid loss into the peritoneum by conserving water and sodium. Basic treatment is restriction of dietary sodium and fluid intake together with a combination of sodium-losing and potassium-conserving diuretics. Over-diuresis is a danger, particularly potassium depletion and hepatic encephalopathy; diuresis-refractory patients may develop hepatorenal syndrome (functional renal failure). Large abdominal para-

centeses are contraindicated except for diagnosis and urgent relief of painful, tense ascites. Reinfusion, either of unaltered ascitic fluid or of ultrafiltered fluid may bring relief in nonmalignant cases. A peritoneo-venous shunt has been developed that drains the peritoneal cavity via a tube into the internal or external jugular vein, using respiration as the force to open and shut a valve in the system. This technique may be particularly useful in Budd-Chiari syndrome; the exact mortality and morbidity are not yet clear. Long-term trials comparing all these methods are urgently needed.

7167 CUTANEOUS GRANULOMATA WITH PRIMARY BILIARY CIRRHOSIS. (Eng.) Byrne, J. P. H.; Cochrane, A. M. G.; Williams, D. I.; Williams, R. (King's Coll. Hosp. and Medical Sch., Denmark Hill, London SE5 9RS, England). *Proc. R. Soc. Med.* 70(12):897-898; 1977.

The case of a patient with primary biliary cirrhosis who presented with cutaneous granulomata is reported. The patient, a 74-yr-old woman, had a 2-yr history of generalized pruritus that was associated for the last year with a widespread sheeted papular eruption in the trunk and limbs. On examination, there was slight generalized hyperpigmentation and a sheeted glistening flesh-colored papular eruption affecting the upper chest, back, and arms. A skin biopsy revealed granulomata in the dermis consisting of mononuclear cells, epithelioid cells, and Langhan's type giant cells. A liver biopsy showed changes consistent with primary biliary cirrhosis. The patient was treated with cholestyramine, methyl cellulose eye drops, and monthly injections of vitamins A, D, and K. The authors hypothesize that circulating complexes involving IgM, which is elevated in primary biliary cirrhosis, lodge in the skin causing a vasculitis with subsequent granulomatous formation.

7168 HYPERGLUCAGONEMIA IN CIRRHOSIS: ALTERED SECRETION AND SENSITIVITY TO GLUCAGON. (Eng.) Sherwin, R. S.; Fisher, M.; Bessoff, J.; Snyder, N.; Hendler, R.; Conn, H. O.; Felig, P. (Yale Univ. Sch. Medicine, New Haven, CT 06510). *Gastroenterology* 74(6):1224-1228; 1978.

To study the mechanism of hyperglucagonemia in liver cirrhosis, the turnover of plasma glucagon was examined in cirrhosis. In addition, the effect of cirrhosis on tissue responsiveness to physiological increments in plasma glucagon was studied. The plasma glucagon concentration was elevated two- to sixfold in 13 cirrhotic patients with spontaneous portal systemic shunting or surgically induced portacaval anastomosis, but it was comparable to that in the 15 controls in the 4 cirrhotics without portasystemic shunting. The metabolic clearance rate of glucagon was normal in all of the cirrhotic groups, but the estimated basal systemic delivery rate of glucagon was increased two- to sixfold in the hyperglucagonemic patients. The blood glucose response to infusion of glucagon (3 ng/kg/min) was reduced in the cirrhotics with portasystemic shunting or portacaval anastomosis ($p<0.05$), and correlated inversely with the delivery rate of endogenous glucagon ($r=0.63$, $p<0.01$). The administration of ammonium chloride (3 g) failed to elevate plasma glucagon concentration. It is concluded that hyperglucagonemia in cirrhosis is a consequence of hypersecretion rather than decreased hormonal catabolism. A negative feedback signal may exist between hepatic sensitivity to glucagon and the secretion of this hormone.

7169 MYELOPATHY IN CIRRHOSIS. (Eng.) Robinson, C. E.; Anzarut, A. (G. F. Strong Rehabilitation Center, Canada). *Paraplegia* 16(1):3-4; 1978.

The case of a patient with spinal cord disease associated with portacaval shunt for portal hypertension and cirrhosis is presented. Several months after the shunt was performed, the patient began to complain of weakness in the extremities, especially in the legs. When he was hospitalized 1 yr later, he had difficulty walking due to a spastic gait. He also had clinical jaundice, hepatomegaly, and some pedal edema. He had continued to drink excessively following surgery. He was found to have spastic tetraparesis but no sensory impairment. Bilateral adductor tenotomies were done to improve the patient's gait. Despite lower extremity weakness and spasticity, he was able to walk in parallel bars or with a walker, wearing below-knee braces. However, his rehabilitation program was interrupted on several occasions by dietary protein excess and hepatic precoma. The authors feel that he will not be a functional walker and will depend on a wheelchair for locomotion.

7170 EVIDENCE THAT ANGIOTENSIN-II PLAYS AN IMPORTANT ROLE IN THE HOMEOSTASIS OF ARTERIAL PRESSURE IN CIRRHOSIS WITH ASCITES [Abstract]. (Eng.) Arroyo, V.; Bosch, J.; Navarro, F.; Betriu, A.; Mauri, M.; Rodes, J. (Hospital Clinico y Provincial, Barcelona, Spain). *Digestion* 16(4):350-351; 1977.

7171 DEMECLOCYCLINE (DMC) TREATMENT OF FLUID RETENTION IN HEPATIC CIRRHOSIS (HC) [Abstract]. (Eng.) Riestra, J.; Skowsky, R.; Dougherty, M.; Larson, A.; Swan, L.; Smith, P. (Veterans Admin. Hosp., Long Beach, CA). *Clin. Res.* 26(2):112A; 1978.

7172 RADIONUCLIDE SCAN PATTERNS IN BACTERIAL PERITONITIS ASSOCIATED WITH LIVER DISEASE [Abstract]. (Eng.) Punjabi, E.; Hain, D. R.; Brody, D. H.; Leevy, C. M. (Coll. Medicine, Dentistry of New Jersey, Newark, NJ). *Gastroenterology* 73(5):1240; 1977.

See also, 6818, 6923, 6932, 6978, 7067, 7144, 7150, 7152, 7154, 7209.

7173 POSTOPERATIVE BIOPSY OF THE COMMON BILE DUCT VIA THE T-TUBE TRACT. (Eng.) Palayew, M. J.; Stein, L. (McGill Univ. and Jewish General Hosp., 3755 Cote St. Catherine Rd., Montreal, Quebec H3T 1E2, Canada). *Am. J. Roentgenol.* 130(2): 287-289; 1978.

Two cases of postoperative common bile duct forceps biopsy via a postoperative T-tube tract are presented. Both patients underwent this procedure because of fixed postoperative filling defects in the common bile duct. Using this technique, a neoplastic process could be excluded in both cases. Although the procedure was well tolerated without incident or complication in both patients, bleeding, perforation, and pancreatitis could occur if caution is not employed.

7174 ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY IN A SURGICAL UNIT. (Eng.) Standertskjold-Nordenstam, C. G.; Fraki, O. I. (Univ. Central Hosp., SF-00290 Helsinki 29, Finland). *Ann. Clin. Res.* 10(1):30-37; 1978.

The value of endoscopic retrograde cholangiopancreatography (ERCP) in the diagnosis of biliary and pancreatic diseases was assessed by reviewing the results of 200 procedures performed on 195 patients in a surgical unit. ERCP was diagnostic in 80% of the cases. The indications for the procedure were jaundice (27%), postcholecystectomy pain (22%), recurrent acute pancreatitis (19%), complicated attack of acute pancreatitis (14%), and other (18%). The results of endoscopic retrograde cholangiography were normal in 26% of patients with persistent jaundice, and operation was thus avoided. In patients with postcholecystectomy pain, pathological findings were found in 50%, and half of them were operated upon. In pancreatitis, demonstration of the pancreatic ducts and grading of the disease facilitated selection of the treatment and enabled preoperative planning of the surgical procedure. The pancreas was resected in 13 of 59 cases with diagnostic endoscopic retrograde pancreatography. In pancreatic carcinoma, ERCP led directly to diagnosis, but only 2 (ampullary carcinomas) of 10 were operable. The overall complication rate was 4%, including one case of fatal hemorrhagic pancreatitis.

7175 EFFECT OF CALCITONIN ON THE SERUM AMYLASE LEVELS AFTER ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY. (Eng.) Odes, H. S.; Novis, B. N.; Barbezat, G. O.; Bank, S. (Groote Schuur Hosp., Observatory, 7925 Cape Town, South Africa). *Digestion* 16(1/2):180-184; 1977.

A double-blind study of the effect of calcitonin was carried out in 30 patients undergoing endoscopic retrograde cholangiopancreatography (ERCP), to determine whether calcitonin might protect against pancreatitis and hyperamylasemia, which sometimes complicate this procedure. Seventeen patients received an i.v. calcitonin infusion (2.5 µg/hr diluted in 50 ml 0.154 M NaCl) and 13 received a control NaCl infusion 4 hr before ERCP. There was no significant difference in the mean serum amylase concentration in patients receiving calcitonin or placebo during any of five observation periods. Five patients on calcitonin had abnormally high serum amylase levels, and two of the five developed abdominal pain typical of acute pancreatitis. Among those who received placebo, two had high serum amylase levels and abdominal pain. There was no significant difference in the urinary amylase output after ERCP in patients receiving calcitonin or placebo. The results suggest that calcitonin does not reduce the incidence of hyperamylasemia or pancreatitis after ERCP.

7176 RISK OF CANNULATION OF THE PAPILLA OF VATER. (Eng.) Myren, J. (No affiliation given). *Scand. J. Gastroenterol.* 12(Suppl. 47):22-24; 1977.

A review of complications following endoscopic retrograde cholangiopancreaticography (ERCP) is presented using several large series recently reported. In a series of 8,691 cases in the United States, the success rate was 70%, frequency of complications about 3%, and death as a consequence of complications 0.2%. Pancreatitis after injection was found in 1% of cases; there were no deaths in this series. Pancreatic sepsis was observed in 25 cases, most probably caused by injection of the contrast medium into pseudocysts or behind stenoses; 5 of these patients died. Cholangitis was observed in 0.8% of cases and 8 of these 72 patients died, with 90% of them having obstructed bile ducts; prompt surgical intervention in such cases is important. Instrumental injury occurred in 16 patients, duodenal perforation in 3 with 1 death, and bleeding from esophageal varices in 1 patient with 1 death. Abnormal anatomy of the stomach and duodenum is a common cause of these complications, which may be prevented by prior x-ray examination. Among 12,421 patients in Europe and Japan, endoscopic retrograde cholangiography (ERC) was performed in 8,060 cases and endoscopic retrograde pancreaticography (ERP) in 10,004 cases. Cholangitis occurred in 0.38% and 0.65% of the ERC and ERP procedures, resp., and pancreatitis occurred only after ERP (0.65%, 9 of the 65 patients died). ERCP is a valuable method in which benefit far exceeds the risk.

7177 BILE DUCT ADENOMAS AS LIVER NODULES. (Eng.) Cho, C.; Rullis, I.; Rogers, L. S. (Veterans Admin. Hosp., Syracuse, NY 13210). *Arch. Surg.* 113(3):272-274; 1978.

To improve the differential diagnosis of bile duct adenoma or benign cholangioma from meta-

static tumor, two case reports and 2,125 consecutive autopsy cases from a 10-yr period were reviewed. A 59-yr-old man with ulcerative colitis was suspected of having a malignancy on x-ray examination of the sigmoid colon. A frozen section biopsy was thought to reveal a metastatic well-differentiated adenocarcinoma, but re-examination of the permanent stained section established the diagnosis of bile duct adenoma. A 48-yr-old man injured in a car accident was found to have a single, whitish, 0.5-cm, firm nodule in the right lobe of the liver; it was diagnosed by frozen section as bile duct adenoma. Among the biopsy cases, 0.6% were found to have had bile duct adenomas; each case was an incidental finding, the clinical records showed no symptoms or signs related to the lesions, and the cause of death was not related to the adenomas in any case. A single nodule was found in nine cases, two nodules in three cases, and multiple lesions in one case; all were <1.0 cm in diameter; they were grayish-white to slightly yellow, subcapsular nodules and fell histologically into three groups. Group 1, bile duct adenoma with active bile duct proliferation and considerable lymphocytic infiltrate, included lesions relatively well-demarcated from surrounding liver tissue that showed irregularly branching and proliferating bile ducts with cuboidal, pale acidophilic to basophilic epithelial linings; the stroma was invariably infiltrated by lymphocytes and there were occasional lymphoid aggregates either in the nodule or at the periphery. The uniformity of cells and lack of atypia generally warrant diagnosis as a benign lesion, but, as in the first case, it can be mistaken for metastatic malignancy. Group 2, bile duct adenoma with abundant hyalinized stroma and sparse, inactive bile ducts, were generally well-demarcated, nonencapsulated, wedge-shaped lesions with a wide base on the capsular surface. Stroma was abundant with collagenation widely separating tubular lumens lined by flattened epithelium. Normal portal triads were generally difficult to identify and there were occasional lymphocytic infiltrates. Group 3, multiple bile duct adenomatosis, included lesions similar morphologically to those in group 2. There were numerous lesions in the parenchyma and a few subcapsularly, some interconnecting each other. Occasionally the bile ducts were greatly dilated to form cystic spaces, which could contain acidophilic proteinaceous material or bile.

7178 STUDIES ON THE PATHOGENESIS OF BILIARY ATRESIA. (Eng.) Witzleben, C. L.; Buck, B. E.; Schnaufer, L.; Brzosko, W. J. (Children's Hosp. Philadelphia, 34th St. and Civic Center Blvd., Philadelphia, PA 19104). *Lab. Invest.* 38(5):525-532; 1978.

Liver biopsy and the extrahepatic biliary system from five infants (age 6 weeks-2.5 months) who underwent portoenterostomy for biliary atresia were studied by light microscopy to delineate the character and distribution of the anatomic lesions and by culture and immunofluorescence techniques for evidence of two viruses (cytomegalovirus and hepatitis B) that have been suspected in the genesis of biliary atresia. The case reports of the patients are presented. Control preparations were obtained from age-matched controls. The liver biopsies showed typical findings, with variable giant cell transformation, cholestasis, and prominent bile duct proliferation. In the extrahepatic biliary system, in all five cases there was lumen obliteration in the common hepatic duct, and in three cases there was also comparable obliteration in the common bile duct. No lumen dilation was evident proximal to the areas of obliteration. In the areas of obliteration, there was evidence of a resolving inflammatory process. Where the lumen was present, it tended to be small, especially in the hepatic and common ducts. In the porta hepatis, there appeared to be various stages of an evolving lesion, the earliest stage of which included extensive active epithelial injury with developing fibrosis, and the latest, more advanced fibrosis with reduction in duct lumen area. In the earlier stage, a dense inflammatory infiltrate, with small numbers of polymorphonuclear leukocytes, numerous lymphocytes, plasma cells, and eosinophils, was present. In the latter stage, mononuclear cells predominated, polymorphonuclear leukocytes were scant, but eosinophils were often still quite prominent. These findings demonstrate the presence of active ductal epithelial injury, at least in the porta hepatis, in this age group. There was no evidence of cytomegalovirus in any case or of hepatitis B in three of five cases. In two cases, one of the less specific techniques showed suggestive evidence of hepatitis B in the liver. These latter findings suggest that other viruses need to be sought or that cases should be studied at an earlier stage for the presence of these viruses.

7179 EXTRAHEPATIC BILIARY ATRESIA: RECENT DEVELOPMENTS IN MANAGEMENT. (Eng.) Howard, E. R.; Mowat, A. P. (King's Coll. Hosp. Medical Sch., London SE5 8RX, England). *Arch. Dis. Child.* 52(11):825-827; 1977.

Developments in the management of extrahepatic biliary atresia in infants are briefly reviewed. Extrahepatic biliary atresia is commonly divided into surgically correctable and noncorrectable types. The former, accounting for approximately 15% of all cases, implies that there is a segment of extrahepatic bile duct, patent up to the porta hepatis, available for direct biliary-intestinal anastomosis; no such segment is present in the noncorrectable cases. Although a satisfactory anastomosis may be created between bile duct and bowel in the "correctable" cases, only a minority of patients drain bile satisfactorily and survive for an extended period. Attempts to treat the "noncorrectable" types by partial hepatic resection, insertion of drainage tubes in the hepatic parenchyma, thoracic duct drainage to the esophagus, and hepatic lymph drainage to the jejunum have all failed. One author has shown that removal of the extrahepatic bile ducts and anastomosis of a loop of bowel to the area of the porta hepatis could result in bile drainage and long-term survival. Efforts to replicate this author's work were not universally successful, but the most recent reports from his unit suggest that if the operation is carried out

by 60 days of age, 80% will develop bile drainage, falling to 20% if delayed beyond this point. Three complications commonly occur after portoenterostomy: recurrent cholangitis, increased intrahepatic fibrosis, and portal hypertension. The introduction of portoenterostomy has clearly increased the chances of long-term survival in infants with extensive destruction of the extrahepatic bile ducts, but such survival is still only achieved in a minority of patients. It appears that previous advice to postpone surgery in cases of suspected biliary atresia is not in the best interest of the patient.

7180 EXPERIMENTAL INVESTIGATIONS INTO THE ETIOLOGY OF CHOLANGITIS FOLLOWING OPERATION FOR BILIARY ATRESIA. (Eng.) Hirsig, J.; Kara, O.; Rickham, P. P. (Dept. Pediatric Surgery, Univ. Zurich, Zurich, Switzerland). *J. Pediatr. Surg.* 13(1):55-57; 1978.

Experiments were carried out on 8-week-old Gottingen minipigs to investigate the causation of cholangitis seen after hepato-porto-entero anastomosis. In group 1 (7 animals), the bile duct was ligated and the gallbladder was excised. In group 2 (5 animals), the lymphatic drainage of the liver was destroyed by resecting and ligating all lymphatic vessels in the region of the porta hepatis and by excision of the periportal lymph glands. In group 3 (7 animals), the bile duct was tied and the lymphatic drainage was resected. In group 4 (7 animals), the bile duct was ligated, and bilateral truncal vagotomy was performed. In group 5 (22 animals), the operations performed in group 3 were repeated, and bilateral truncal vagotomy was added. The incidence of cholangitis was 0/7, 0/7, and 0/5 in groups 1, 2, and 4, resp.; the incidence of cholangitis with hepatic abscesses was 5/7 and 13/22 in groups 3 and 5, resp. It appears that, in the minipig, the chances of postoperative cholangitis are much increased if the lymphatic drainage from the liver is at least partially destroyed. *Streptococcus viridans, S. hemolyticus,* and *Staphylococcus aureus* were often found, and *Escherichia coli* and *Klebsiella* were occasionally discovered. These infections were found only in the liver and were probably hematogenous in origin, brought about by interfering with the resistance of the hepatic reticuloendothelial system by destroying the lymphatic drainage. Recent clinical experience is also cited to support the conclusion that when a hepatic portoenterostomy is carried out for biliary atresia, trauma to the lymphatics in the porta hepatis should be avoided, and an additional omento-hepato-portopexy should be done.

7181 RECURRENT PYOGENIC CHOLANGITIS: A STUDY BY ENDOSCOPIC RETROGRADE CHOLANGIOGRAPHY. (Eng.) Lam, S. K.; Wong, K. P.; Chan, P. K. W.; Ngan, H.; Ong, G. B. (Queen Mary Hosp., Hong Kong). *Gastroenterology* 74(6):1196-1203; 1978.

The applicability and clinical value of endoscopic retrograde cholangiograms were studied in 52 patients with recurrent pyogenic cholangitis. The earlier changes of recurrent pyogenic cholangitis were identified and found to be confined to the intrahepatic biliary tree. The left hepatic duct was more severely affected than the right hepatic duct and had a higher infestation by clonorchis. The severity of radiological changes correlated well with the duration of illness and the need for surgery. Gallstones were present in 34.2% of the patients and pancreatic ductal abnormality in 7.7%. The decision for surgery could be made early and accurately, and the type of surgery and the assignment of surgeons could be planned in advance. Cholangitis complicated endoscopic retrograde cholangiograms in 23.1% of the initial 26 patients without antibiotic cover but in none of the subsequent 26 in whom this was used. This study shows that endoscopic retrograde cholangiography confers significant advantages to the management of recurrent pyogenic cholangitis.

7182 A FATHER AND SON WITH CHOLESTASIS AND PERIPHERAL PULMONIC STENOSIS. (Eng.) Riley, C. A.; LaBrecque, D. R.; Ghent, C.; Horwich, A.; Klatskin, G. (Yale Univ. Sch. Medicine, 333 Cedar St., New Haven, CT 06510). *J. Pediatr.* 92(3): 406-411; 1978.

The case reports of a 27-yr-old man and his infant son are presented to establish diagnostic criteria for the syndrome of cholestasis and peripheral pulmonic stenosis (PPS) that permit its differentiation from Byler disease, a progressive form of intrahepatic cholestasis. Both the father and son presented with neonatal jaundice and cardiovascular abnormalities, have frontal bossing, vertebral anomalies, hypercholesterolemia, and mild malabsorption of fat. Early liver biopsy reveals the absence of the bile ducts; late liver biopsy shows no cirrhosis or fibrosis. Survival is prolonged. The syndrome appears to be inherited as an autosomal dominant trait. In Byler disease, the presenting symptom is malabsorption; jaundice occurs in attacks and then persists; cholesterol level is normal or low; there is rickets and no cardiovascular malformation; early liver biopsy shows fibrosis or decreased ducts; late biopsy shows cirrhosis; death occurs in childhood; and the trait behaves as an autosomal recessive. The most likely underlying pathogenesis of cholestasis with PPS is an inborn error of metabolism. It is postulated that there may be a defect in bile formation, perhaps a defect in bile acid or cholesterol excretion, resulting in a diminution of total bile flow that causes a rapidly progressive atrophy of a majority of the intrahepatic bile ducts shortly after birth. Choledochoduodenostomy has been used as therapy, but with unclear benefit. Cholestyramine and phenobarbital were not of benefit to the father. There are other aspects of these cases that remain unclear and warrant additional investigation.

7183 I^{131}-ROSE BENGAL SCANNING IN THE DETECTION OF CHOLECYSTOCOLIC FISTULA: NEW USE OF AN ESTABLISHED PROCEDURE. (Eng.) Zaw-Win, B.; Darwish, M.; Dibos, P. E.; Razzak, I. A. (Franklin Square Hosp., Towson, MD). *Am. J. Gastroenterol.* 68(4):396-398; 1978.

The case of a 60-yr-old man who was admitted to hospital with a 3-month weight loss of 12.5 kg and vague right upper quadrant pain is presented. Previous examination had revealed chronic gastritis and abnormal liver function tests. Upper gastrointestinal series, barium enema, abdominal sonography, and celiac angiogram failed to reveal an abnormality. The gallbladder was not visualized on a p.o. cholangiogram or an i.v. cholangiogram, but air was seen in the biliary tree. A ^{131}I-rose bengal liver study revealed normal distribution of the tracer in the liver 30 min after injection, normal activity in the liver, gallbladder, transverse colon, and splenic flexure at 2 hr, and decreasing activity in the liver with increasing activity in the transverse colon and splenic flexure after 4 hr. These findings suggested a cholecystocolic fistula, which was confirmed at laparotomy. Cholecystectomy and repair of the cholecystocolic fistula were performed. Pathological examination revealed chronic cholecystitis and cholelithiasis. It is recommended that ^{131}I-rose bengal studies be used in patients suspected of having fistulas between the gallbladder and other organs. The procedure is relatively simple, safe, and noninvasive; its diagnostic sensitivity remains to be established.

7184 HEPATIC FUNCTION IN CHOLELITHIASIS. (Pol.) Markert, R. (Instytut Chirurgii AM, ul. Zelwerowicza 26a, 90-147 Lodz, Poland). *Pol. Przegl. Chir.* 49(12):1265-1270; 1977.

Liver function tests were performed in 50 patients with uncomplicated cholelithiasis before, immediately and 6-12 months after surgery. Liver tissue samples collected during surgery were also examined histologically; they showed chronic hepatitis in 30% of the patients. The BSP retention was increased in all patients before, immediately after, and 6-12 months after surgery; increases of >20% were found in 36% of the patients before surgery, in 18% immediately after surgery, and in 12% 6-12 months after surgery. The aspartate-aminotransferase activity was increased in 28% of the patients before surgery, in 20% after surgery, and in 2% 6-12 months after surgery. The alanine-aminotransferase activity was increased in 43% of the patients before surgery, in 38% after surgery, and in 9% 6-12 months after surgery. Symptoms of impaired hepatic function persisted in 10% of the patients. The findings indicate that surgery does not always lead to full recovery.

7185 PRESENT FEATURES OF GALLSTONES IN JAPAN: A COLLECTIVE REVIEW OF 2,144 CASES. (Eng.) Nagase, M.; Tanimura, H.; Setoyama, M.; Hikasa, Y. (Kyoto Univ. Sch. Medicine, Shogoin, Sakyoku, Kyoto, Japan 606). *Am. J. Surg.* 135(6):788-790; 1978.

The types and sites of gallstones were studied in 2,144 patients operated on for cholelithiasis at 37 hospitals during the last 22 months. Cholesterol stones were seen in 70.4% of patients, and 86.3% of the cholesterol stones occurred in the gallbladder alone. Bilirubin stones were seen in 23.5% of cases and were almost equally distributed in the gallbladder and the common bile duct. Most patients younger than 39 yr had cholesterol gallstones, and these were located mainly in the gallbladder. In contrast, patients older than 60 yr mostly had bilirubin stones, and these were located in both the common bile duct and the gallbladder. Almost twice as many women as men had cholesterol stones, but no sex difference was noted with bilirubin stones. The authors conclude that recent westernization of dietary habits in Japan is the most probable factor causing the increased incidence of cholesterol gallstones. The decreased incidence of bilirubin stones may be caused by the decreased incidence of biliary infection and increased intake of dietary protein.

7186 COMPARISON BETWEEN THE USE OF ORAL CONTRACEPTIVES AND THE INCIDENCE OF SURGICALLY CONFIRMED GALLSTONE DISEASE. (Eng.) Leissner, K. H.; Wedel, H.; Schersten, T. (Sahlgrenska sjukhuset, S-413 45, Goteborg, Sweden). *Scand. J. Gastroenterol.* 12(7):893-896; 1977.

To determine whether there is a relationship between the use of oral contraceptives and the development of gallstone disease, the incidences of gallstone surgery in women and men in two Swedish cities in 1961 (before the introduction of oral contraceptives) were investigated and compared with the corresponding incidences in 1971 (2 yr after the peak sale of oral contraceptives and 6 yr after their introduction). The number of cholecystectomies in men in both cities increased from 222 per 1,000 inhabitants in 1961 to 406/1,000 in 1971 and women from 384/1,000 to 597/1,000. In one city (Falun), there was an increased incidence of cholecystectomies in women aged 25-29 yr and those aged 55-65 yr between 1961 and 1971. The change in the incidence of cholecystectomy in men and women in Gothenburg was statistically analyzed, using the ratio $(f^a_{71}/f^a_{61})/(m^a_{71}/m^a_{61})$, in which f^a_{61} and f^a_{71} denote the incidence for women in any 5-yr age group for 1961 and 1971 and m^a_{61} and m^a_{71} denote the corresponding incidences for men. The ratio was above unity in the ages between 25 and 54 yr and reached statistical significance in the age groups 25-29, 35-39, and 40-44 yr ($p=0.029$, $p=0.024$, and $p=0.045$, resp.). These findings suggest a causal relationship between the use of oral contraceptives and the development of gallstones.

7187 A PROSPECTIVE STUDY OF THE CLINICAL VALUE AND ACCURACY OF GREY SCALE ULTRASOUND IN DETECTING GALLSTONES. (Eng.) McKay, A. J.; Duncan, J. G.; Imrie, C. W.; Joffe, S. N.; Blumgart, L. H. (Royal Infirmary, Glasgow, Scotland). *Br. J. Surg.* 65(5):330-333; 1978.

The accuracy and possible clinical value of grey scale ultrasonography in the detection of gallstones were studied prospectively in 100 unselected patients presenting with recurrent biliary colic, acute cholecystitis, or acute pancreatitis. Adequate visualization of the gallbladder was obtained

in 79 cases, with 3 false-positive and no false-negative results. In patients in whom scanning was technically satisfactory and adequate visualization was obtained, the presence or absence of gallstones was correctly diagnosed in 96%. The gallbladder was adequately visualized in 80% of 30 patients with recurrent biliary colic, in 87% of 30 patients with acute cholecystitis, and 73% of 40 patients with acute pancreatitis. One of the false-positive results occurred in the biliary colic group. This patient showed several discrete groups of echoes on the posterior wall without shadowing. The other two false-positive cases were recorded in the acute pancreatitis group; neither demonstrated shadowing, but both showed an irregular area of increased echoes along a segment of the posterior wall of the gallbladder. The major cause of failure was the presence of intestinal gas obscuring the ultrasound image, and the gallbladder was not visualized in 21% of the cases. Grey scale ultrasonography is of value in patients in whom oral cholecystography fails or is contraindicated and in patients with compromised liver function.

7188 COMPARISON OF FIXED DOSES OF CHENODEOXYCHOLIC ACID FOR GALLSTONE DISSOLUTION. (Eng.) Bateson, M. C.; Murison, J.; Ross, P. E.; Bouchier, I. A. D. (Ninewells Hosp. and Medical Sch., Dundee DD1 9SY, Scotland). *Lancet* 1(8074): 1111-1114; 1978.

Ninety-six patients with gallstones who were treated for up to 4 yr with chenodeoxycholic acid in daily doses of 500, 750, or 1,000 mg were studied to determine whether fixed-dose therapy can be used successfully in clinical practice and to establish whether there are any differences in response to different doses. None of the patients started on 500 mg daily showed complete gallstone dissolution. Eight of 41 patients on 750 mg daily had complete dissolution of their radiolucent gallbladder stones after 6 or more months, and a further 4 showed partial dissolution. Five of 28 patients on 1,000 mg daily had complete dissolution of their radiolucent stones after at least 6 months, and a further 9 showed partial gallstone dissolution. The mean duration of therapy was greater on 750 mg than on 1,000 mg/day (1.27 versus 0.58 yr), and when results were analyzed after the first 6 months of therapy, the total response-rate was significantly ($p<0.05$) greater for the 1,000 mg dose (13/28) than for the 750 mg dose (9/41). The individual response of radiolucent gallbladder stones to therapy could not be predicted from stone size, weight of patient, dosage per kg, or change in biliary lipids. Treatment of radiolucent gallstones with chenodeoxycholic acid should start at 1,000 mg daily.

7189 SUCCESSFUL REMOVAL OF RETAINED BILE DUCT STONES BY ENDOSCOPIC SPHINCTEROTOMY. (Eng.) Byrnes, D. J.; Hennessy, W. B.; Meredith, C. G.; Piper, R. B. (St. Vincent's Hosp., Sydney, New South Wales 2010, Australia). *Med. J. Aust.* 2(24):803-804: 1977.

Two cases in which endoscopic sphincterotomy was successful in allowing the passage of stones retained in the common bile duct after cholecystectomy are presented. In the first patient, a 55-yr-old woman who had experienced four episodes of jaundice during a 14-yr period following cholecystectomy, an i.v. cholangiogram failed to outline the common bile duct. Endoscopic retrograde cholangiography showed the common duct to be grossly dilated and to contain five calculi, each approximately 1 cm in diameter. A 1.5-cm sphincterotomy was performed; this procedure was followed by a gush of bile and dye into the duodenum. During the following week, the patient experienced an episode of epigastric pain, and a second endoscopic cholangiogram confirmed that all calculi had been passed. In the second patient, a 29-yr-old woman, a post-cholecystectomy T-tube cholangiogram revealed two calculi in the common bile duct. Endoscopic sphincterotomy was performed 3 weeks after the operation. The T-tube was then flushed with sterile saline under antibiotic cover. The infusion was suspended after the patient had a rigor 12 hr later. A second T-tube cholangiogram showed that one stone remained. The sphincterotomy was extended, and this was followed by passage of the second stone. In this case, the authors feel that the surgeon's being able to perfuse the bile duct through the T-tube may have been a factor in ensuring passage of the stones.

7190 OPERATIVE CHOLANGIOGRAPHY IN TWO HUNDRED CONSECUTIVE CHOLECYSTECTOMIES. (Eng.) Sugrue, W. J.; Stewart, R. J.; Pascoe, D. L.; Macbeth, W. A. A. G. (Christchurch Clinical Sch. Medicine, Christchurch, New Zealand). *N.Z. Med. J.* 86(600):470-471; 1977.

The value of operative cholangiography and the reasons for its failure were assessed by reviewing the records of 200 consecutive patients undergoing cholecystectomy for gallstones. Of these, 164 had an operative cholangiogram; the remaining 36 had no examination because of satisfactory preoperative x-rays of the bile ducts, inability to cannulate the cystic duct, x-ray machine failure, anticipated hazard to the patient, emergency cholecystectomy, no arrangements made, and easily palpable common bile duct stones. There were 37 patients who had one or more traditional criteria for common bile duct exploration but had a normal cholangiogram; these patients were thus spared unnecessary choledochotomy. Unsuspected common duct stones were detected by cholangiography in three patients. In 31 examinations that were considered to be failures, the major faults were exposure or film fault in 9, incorrect tube positioning in 9, nonvisualization of hepatic ducts in 6, obscuring of the bile ducts by the spine in 4, and catheter tip in duodenum in 3. It appears that the major advantage of operative cholangiography lies in the avoidance of unnecessary common bile duct exploration.

7191 THE REASONS FOR FAILURE OF ENDOSCOPIC RETROGRADE CHOLANGIO-PANCREATOGRAPHY IN

The case of a 60-yr-old man who was admitted to hospital with a 3-month weight loss of 12.5 kg and vague right upper quadrant pain is presented. Previous examination had revealed chronic gastritis and abnormal liver function tests. Upper gastrointestinal series, barium enema, abdominal sonography, and celiac angiogram failed to reveal an abnormality. The gallbladder was not visualized on a p.o. cholangiogram or an i.v. cholangiogram, but air was seen in the biliary tree. A ^{131}I-rose bengal liver study revealed normal distribution of the tracer in the liver 30 min after injection, normal activity in the liver, gallbladder, transverse colon, and splenic flexure at 2 hr, and decreasing activity in the liver with increasing activity in the transverse colon and splenic flexure after 4 hr. These findings suggested a cholecystocolic fistula, which was confirmed at laparotomy. Cholecystectomy and repair of the cholecystocolic fistula were performed. Pathological examination revealed chronic cholecystitis and cholelithiasis. It is recommended that ^{131}I-rose bengal studies be used in patients suspected of having fistulas between the gallbladder and other organs. The procedure is relatively simple, safe, and noninvasive; its diagnostic sensitivity remains to be established.

7184 HEPATIC FUNCTION IN CHOLELITHIASIS. (Pol.) Markert, R. (Instytut Chirurgii AM, ul. Zelwerowicza 26a, 90-147 Lodz, Poland). *Pol. Przegl. Chir.* 49(12):1265-1270; 1977.

Liver function tests were performed in 50 patients with uncomplicated cholelithiasis before, immediately and 6-12 months after surgery. Liver tissue samples collected during surgery were also examined histologically; they showed chronic hepatitis in 30% of the patients. The BSP retention was increased in all patients before, immediately after, and 6-12 months after surgery; increases of >20% were found in 36% of the patients before surgery, in 18% immediately after surgery, and in 12% 6-12 months after surgery. The aspartate-aminotransferase activity was increased in 28% of the patients before surgery, in 20% after surgery, and in 2% 6-12 months after surgery. The alanine-aminotransferase activity was increased in 43% of the patients before surgery, in 38% after surgery, and in 9% 6-12 months after surgery. Symptoms of impaired hepatic function persisted in 10% of the patients. The findings indicate that surgery does not always lead to full recovery.

7185 PRESENT FEATURES OF GALLSTONES IN JAPAN: A COLLECTIVE REVIEW OF 2,144 CASES. (Eng.) Nagase, M.; Tanimura, H.; Setoyama, M.; Hikasa, Y. (Kyoto Univ. Sch. Medicine, Shogoin, Sakyoku, Kyoto, Japan 606). *Am. J. Surg.* 135(6):788-790; 1978.

The types and sites of gallstones were studied in 2,144 patients operated on for cholelithiasis at 37 hospitals during the last 22 months. Cholesterol stones were seen in 70.4% of patients, and 86.3% of the cholesterol stones occurred in the gallbladder alone. Bilirubin stones were seen in 23.5% of cases and were almost equally distributed in the gallbladder and the common bile duct. Most patients younger than 39 yr had cholesterol gallstones, and these were located mainly in the gallbladder. In contrast, patients older than 60 yr mostly had bilirubin stones, and these were located in both the common bile duct and the gallbladder. Almost twice as many women as men had cholesterol stones, but no sex difference was noted with bilirubin stones. The authors conclude that recent westernization of dietary habits in Japan is the most probable factor causing the increased incidence of cholesterol gallstones. The decreased incidence of bilirubin stones may be caused by the decreased incidence of biliary infection and increased intake of dietary protein.

7186 COMPARISON BETWEEN THE USE OF ORAL CONTRACEPTIVES AND THE INCIDENCE OF SURGICALLY CONFIRMED GALLSTONE DISEASE. (Eng.) Leissner, K. H.; Wedel, H.; Schersten, T. (Sahlgrenska sjukhuset, S-413 45, Goteborg, Sweden). *Scand. J. Gastroenterol.* 12(7):893-896; 1977.

To determine whether there is a relationship between the use of oral contraceptives and the development of gallstone disease, the incidences of gallstone surgery in women and men in two Swedish cities in 1961 (before the introduction of oral contraceptives) were investigated and compared with the corresponding incidences in 1971 (2 yr after the peak sale of oral contraceptives and 6 yr after their introduction). The number of cholecystectomies in men in both cities increased from 222 per 1,000 inhabitants in 1961 to 406/1,000 in 1971 and women from 384/1,000 to 597/1,000. In one city (Falun), there was an increased incidence of cholecystectomies in women aged 25-29 yr and those aged 55-65 yr between 1961 and 1971. The change in the incidence of cholecystectomy in men and women in Gothenburg was statistically analyzed$_a$ using the ratio $(f^a_{71}/f^a_{61})/(m^a_{71}/m^a_{61})$, in which f^a_{61} and f^a_{71} denote the incidence for women in any 5-yr age group for 1961 and 1971 and m^a_{61} and m^a_{71} denote the corresponding incidences for men. The ratio was above unity in the ages between 25 and 54 yr and reached statistical significance in the age groups 25-29, 35-39, and 40-44 yr ($p=0.029$, $p=0.024$, and $p=0.045$, resp.). These findings suggest a causal relationship between the use of oral contraceptives and the development of gallstones.

7187 A PROSPECTIVE STUDY OF THE CLINICAL VALUE AND ACCURACY OF GREY SCALE ULTRASOUND IN DETECTING GALLSTONES. (Eng.) McKay, A. J.; Duncan, J. G.; Imrie, C. W.; Joffe, S. N.; Blumgart, L. H. (Royal Infirmary, Glasgow, Scotland). *Br. J. Surg.* 65(5):330-333; 1978.

The accuracy and possible clinical value of grey scale ultrasonography in the detection of gallstones were studied prospectively in 100 unselected patients presenting with recurrent biliary colic, acute cholecystitis, or acute pancreatitis. Adequate visualization of the gallbladder was obtained

in 79 cases, with 3 false-positive and no false-negative results. In patients in whom scanning was technically satisfactory and adequate visualization was obtained, the presence or absence of gallstones was correctly diagnosed in 96%. The gallbladder was adequately visualized in 80% of 30 patients with recurrent biliary colic, in 87% of 30 patients with acute cholecystitis, and 73% of 40 patients with acute pancreatitis. One of the false-positive results occurred in the biliary colic group. This patient showed several discrete groups of echoes on the posterior wall without shadowing. The other two false-positive cases were recorded in the acute pancreatitis group; neither demonstrated shadowing, but both showed an irregular area of increased echoes along a segment of the posterior wall of the gallbladder. The major cause of failure was the presence of intestinal gas obscuring the ultrasound image, and the gallbladder was not visualized in 21% of the cases. Grey scale ultrasonography is of value in patients in whom oral cholecystography fails or is contraindicated and in patients with compromised liver function.

7188 COMPARISON OF FIXED DOSES OF CHENODEOXYCHOLIC ACID FOR GALLSTONE DISSOLUTION. (Eng.) Bateson, M. C.; Murison, J.; Ross, P. E.; Bouchier, I. A. D. (Ninewells Hosp. and Medical Sch., Dundee DD1 9SY, Scotland). *Lancet* 1(8074): 1111-1114; 1978.

Ninety-six patients with gallstones who were treated for up to 4 yr with chenodeoxycholic acid in daily doses of 500, 750, or 1,000 mg were studied to determine whether fixed-dose therapy can be used successfully in clinical practice and to establish whether there are any differences in response to different doses. None of the patients started on 500 mg daily showed complete gallstone dissolution. Eight of 41 patients on 750 mg daily had complete dissolution of their radiolucent gallbladder stones after 6 or more months, and a further 4 showed partial dissolution. Five of 28 patients on 1,000 mg daily had complete dissolution of their radiolucent stones after at least 6 months, and a further 9 showed partial gallstone dissolution. The mean duration of therapy was greater on 750 mg than on 1,000 mg/day (1.27 versus 0.58 yr), and when results were analyzed after the first 6 months of therapy, the total response-rate was significantly ($p<0.05$) greater for the 1,000 mg dose (13/28) than for the 750 mg dose (9/41). The individual response of radiolucent gallbladder stones to therapy could not be predicted from stone size, weight of patient, dosage per kg, or change in biliary lipids. Treatment of radiolucent gallstones with chenodeoxycholic acid should start at 1,000 mg daily.

7189 SUCCESSFUL REMOVAL OF RETAINED BILE DUCT STONES BY ENDOSCOPIC SPHINCTEROTOMY. (Eng.) Byrnes, D. J.; Hennessy, W. B.; Meredith, C. G.; Piper, R. B. (St. Vincent's Hosp., Sydney, New South Wales 2010, Australia). *Med. J. Aust.* 2(24):803-804: 1977.

Two cases in which endoscopic sphincterotomy was successful in allowing the passage of stones retained in the common bile duct after cholecystectomy are presented. In the first patient, a 55-yr-old woman who had experienced four episodes of jaundice during a 14-yr period following cholecystectomy, an i.v. cholangiogram failed to outline the common bile duct. Endoscopic retrograde cholangiography showed the common duct to be grossly dilated and to contain five calculi, each approximately 1 cm in diameter. A 1.5-cm sphincterotomy was performed; this procedure was followed by a gush of bile and dye into the duodenum. During the following week, the patient experienced an episode of epigastric pain, and a second endoscopic cholangiogram confirmed that all calculi had been passed. In the second patient, a 29-yr-old woman, a post-cholecystectomy T-tube cholangiogram revealed two calculi in the common bile duct. Endoscopic sphincterotomy was performed 3 weeks after the operation. The T-tube was then flushed with sterile saline under antibiotic cover. The infusion was suspended after the patient had a rigor 12 hr later. A second T-tube cholangiogram showed that one stone remained. The sphincterotomy was extended, and this was followed by passage of the second stone. In this case, the authors feel that the surgeon's being able to perfuse the bile duct through the T-tube may have been a factor in ensuring passage of the stones.

7190 OPERATIVE CHOLANGIOGRAPHY IN TWO HUNDRED CONSECUTIVE CHOLECYSTECTOMIES. (Eng.) Sugrue, W. J.; Stewart, R. J.; Pascoe, D. L.; Macbeth, W. A. A. G. (Christchurch Clinical Sch. Medicine, Christchurch, New Zealand). *N.Z. Med. J.* 86(600):470-471; 1977.

The value of operative cholangiography and the reasons for its failure were assessed by reviewing the records of 200 consecutive patients undergoing cholecystectomy for gallstones. Of these, 164 had an operative cholangiogram; the remaining 36 had no examination because of satisfactory preoperative x-rays of the bile ducts, inability to cannulate the cystic duct, x-ray machine failure, anticipated hazard to the patient, emergency cholecystectomy, no arrangements made, and easily palpable common bile duct stones. There were 37 patients who had one or more traditional criteria for common bile duct exploration but had a normal cholangiogram; these patients were thus spared unnecessary choledochotomy. Unsuspected common duct stones were detected by cholangiography in three patients. In 31 examinations that were considered to be failures, the major faults were exposure or film fault in 9, incorrect tube positioning in 9, nonvisualization of hepatic ducts in 6, obscuring of the bile ducts by the spine in 4, and catheter tip in duodenum in 3. It appears that the major advantage of operative cholangiography lies in the avoidance of unnecessary common bile duct exploration.

7191 THE REASONS FOR FAILURE OF ENDOSCOPIC RETROGRADE CHOLANGIO-PANCREATOGRAPHY IN

PATIENTS WITH JAUNDICE. (Eng.) Hoare, A. M.; West, R. J.; Cockel, R. (Queen Elizabeth Hosp., Birmingham 15, England). *Clin. Radiol.* 29(2):201-203; 1978.

The results of 100 consecutive attempts by experienced endoscopists at endoscopic retrograde cholangiopancreatography (ERCP) in jaundiced patients were analyzed to determine the causes for failure. The indications for endoscopy were cholestasis in 74 patients and liver function tests suggestive of incomplete biliary obstruction in 26 (12 of whom had previously undergone cholecystectomy). ERCP provided a diagnosis in 75/100 of the cases. The reason for failure to cannulate the correct duct was obstruction at the lower end of the common bile duct in 15 patients, distortion of the duodenum in 7, and broken instrument in 1; there was no cause for failure in the remaining 2 cases (both had intrahepatic cholestasis and tolerated the procedure poorly). Failure due to obstruction was caused most frequently by carcinoma of the pancreas (8 cases) or by a stone in the common bile duct (5 cases). It is difficult to see how increased skill could have made cannulation succeed in most of these 25 patients. Transhepatic cholangiography may be a possible alternative method of diagnosis in such cases.

7192 ULTRASONIC EXAMINATION IN JAUNDICE. (Ger.) Rettenmaier, G.; Seitz, K. H. (Innere Abteilung des Kreiskrankenhauses, Bunsenstr. 120, 7030 Boblingen, W. Germany). *Dtsch. Med. Wochenschr.* 102(43):1559-1560; 1977.

Experience with the sonographic diagnosis of jaundice is reported. Sonography makes it possible to visualize the gallbladder (dilated or not), gallbladder stones, dilated intrahepatic and extrahepatic bile ducts, stones in the dilated common bile duct, and tumors of the bile duct and porta hepatis. Sonographic investigations were performed in 60 patients with distal biliary obstruction. The cause of the obstruction was recognized in 37 cases (carcinoma of the head of the pancreas was diagnosed in 21 cases, metastases to the porta hepatis in 5, choledocholithiasis in 6, carcinoma of the common bile duct in 3, pancreatitis in 2). The cause of the obstruction was not recognized in 23 cases; it was determined by subsequent investigations to be carcinoma of the head of the pancreas and papilla in 8 cases, metastasis to the porta hepatis in 1, choledocholithiasis in 10, carcinoma of the common bile duct in 1, carcinoma of the gallbladder with metastases in 1, and papillary stenosis in 2. The findings indicate the great value of sonography in the diagnosis of biliary obstruction.

7193 COINCIDENTAL OBSTRUCTIVE AND POST-HEPATITIC CHOLESTATIC JAUNDICE. (Eng.) Welsby, P. D.; Smith, C. C.; Ewen, S. W. B.; Brunt, P. W. (Dept. Medicine, Univ. Aberdeen, Scotland). *Postgrad. Med. J.* 53(626):751-752; 1977.

The case of a patient in whom obstructive jaundice due to carcinoma of the pancreas occurred during the cholestatic phase of viral hepatitis is presented. A previously healthy 37-yr-old man developed jaundice, dark urine, and pale stools. Two weeks after the appearance of jaundice, he developed generalized pruritus. An initial diagnosis of virus A hepatitis proceeding to chronic cholestasis was made on clinical and histological grounds and was corroborated by the development of a similar illness with identical histopathological findings in his brother. However, in spite of corticosteroid and cholestyramine therapy, the pruritus and jaundice persisted. The liver became progressively enlarged and irregular, and at this stage the gallbladder became palpable. The patient then developed liver failure, ascites, and renal failure. Abdominal paracentesis revealed serous fluid containing many adenocarcinoma cells. At autopsy, there was considerable distention of the gallbladder and common bile duct related to an extensive carcinoma of the head of the pancreas, which proved to be a primary ductal adenocarcinoma. The dangers inherent in the use of corticosteroids in jaundiced patients and in the interpretation of a non-response to such therapy in patients with severe cholestatic jaundice are illustrated by this case.

7194 PROLYL HYDROXYLASE IN THE SKIN OF PATIENTS WITH OBSTRUCTIVE JAUNDICE. (Eng.) Than, T.; McGee, J. O.; Blumgart, L. H. (Glasgow Royal Infirmary, Glasgow, Scotland). *J. Clin. Pathol.* 30(11):1044-1047; 1977.

Prolyl hydroxylase activity was estimated in skin specimens from 24 patients with obstructive jaundice and 25 nonjaundiced patients to investigate the suspicion that wound healing is defective in jaundiced patients. Prolyl hydroxylase activity in two of three batches of skin specimens from the jaundiced patients was approximately 50% of that of the controls, and only one-third of that of the controls in the third batch. There was no detectable difference in prolyl hydroxylase activity between patients jaundiced as the result of bile duct obstruction or as a result of liver disease, and there appeared to be no difference between patients with benign or malignant common bile duct obstruction. The results suggest that jaundice is associated with low skin prolyl hydroxylase levels, and in patients submitted to operation for obstructive jaundice this condition might impair healing. Because this enzyme catalyzes hydroxyproline synthesis in collagen, its reduced level could lead to a diminution in the stability of skin collagen, or the low level is simply an indicator of generally depressed collagen synthesis.

7195 COMMON BILE DUCT OBSTRUCTION ASSOCIATED WITH A DACRON H-GRAFT PORTACAVAL SHUNT. (Eng.) Prinz, R. A.; Pickleman, J. (Loyola Univ. Medical Center, 2160 S. First Ave., Maywood, IL 60153). *Arch. Surg.* 113(3):333-335; 1978.

An unusual case is described in which a Dacron prosthesis, used to perform an H-graft portacaval shunt

eroded into the common bile duct, served as a nidus for stone formation and resulted in ascending cholangitis. A 45-yr-old woman had recurrent bleeding esophageal varices for which she had been treated successively with a Dacron H-graft portacaval shunt, subtotal gastrectomy and Billroth II reconstruction, and balloon tamponade. When the portacaval shunt failed to function, intra-arterial vasopressin was followed by splenorenal shunt, splenectomy, and resection of the tail of the pancreas. Fifteen months later, the patient presented with fever, chills, upper right quadrant pain with nausea and vomiting, and jaundice. A diagnosis of ascending cholangitis was made; cholecystectomy and operative cholangiography were carried out. The common bile duct was dilated and obstructed by thick, inspissated bile and friable stone formation. Multiple stones and the full 2-cm Dacron graft were extracted from the duct. The Dacron graft and bile yielded, upon culture, *Escherichia coli*, γ-*Streptococcus* group D, and *Proteus mirabilis*. Microscopically, the gallbladder revealed fibrous thickening with an acute and chronic inflammatory cell infiltrate and focal areas of micro-abscess formation. Prevention of this potential complication by aseptic technique and by isolating the graft from all other intra-abdominal organs by the interposition of viable tissue is important.

7196 DIFFUSE PAPILLOMATOSIS OF THE BILIARY TRACT. (Eng.) Jakimowicz, J. J.; Stockmann, C. H. J. (Dept. Surgery, St. Franciscus Gasthuis, Rotterdam, Netherlands). *Arch. Chir. Neerl.* 29(4):255-259; 1977.

The case of a 62-yr-old man with diffuse papillomatosis of the biliary tract is reported. The patient presented with vague upper abdominal symptoms, dark urine, colorless feces, and icterus. His level of total bilirubin was 240 μM, alkaline phosphatase 216 mU/ml, thymol 2 U, SGOT 115 mU/ml, SGPT 93 U/ml; his urine contained bilirubin and urobilin. Liver biopsy suggested congestion in the biliary tract with pericholangitis. The icterus exacerbated after 1 week, and percutaneous transhepatic cholangiography showed a few slightly dilated intrahepatic bile ducts with several small filling defects and an obstruction near the hepatic hilus. Laparotomy revealed numerous small polypous mucosal tumors in the extrahepatic bile ducts without signs of intraparietal infiltration. The growths were removed as far as possible, a T-drain was left in the choledochus, and cholecystectomy was performed. Cytological examination of resected tissues revealed no malignancy. Pathological examination suggested a benign bile duct papillomatosis. The patient was discharged with nearly normal liver functions. One year later, the patient was readmitted comatose with icterus and with fever up to 40 C; his ESR was 130 mm, WBC 14.2, alkaline phosphatase level 220 mU/ml, and total bilirubin level 110 μM. The patient died several days later from septic shock, probably as a consequence of the recurrence of cholangitis and possibly with the formation of an intrahepatic abscess.

7197 SPONTANEOUS PERFORATION OF BILE DUCTS IN NEONATES. (Eng.) Fitzgerald, R. J.; Parbhoo, K.; Guiney, E. J. (Royal Children's Hosp., Flemington Rd., Parkville, Victoria 3052, Australia). *Surgery* 83(3):303-305; 1978.

The cases of three neonates with spontaneous perforation of the bile ducts are reviewed, and the mode of presentation, treatment, and relevant literature are discussed. All three patients appeared to be well for the first 1 to 2 weeks after birth. Nonbile-stained vomiting and acholic stools were present in all three on admission. Marked abdominal distention was evident in two and became so in the third. The liver function tests were normal in all three children, excluding the raised bilirubin levels. Bile cultures were negative in the two infants in whom this was done. All patients were treated by laparotomy in the seventh week, with attempted closure of the perforation and a simple biliary diversion by cholecyst-jejunostomy with jejunojejunostomy below it. The patients have done well, and one is now 12 yr of age. Experience with these patients confirms the belief that, where there is doubt about the patency of the distal bile duct, a diversionary procedure should be performed.

7198 TWO INSTANCES OF BILE REFLUX WITHOUT ACUTE PANCREATITIS. (Eng.) White, T. T.; Allan, B. J. (Univ. Washington Hosp., Seattle, WA). *Surg. Gynecol. Obstet.* 146(6):917-920; 1978.

The cases of two patients in whom most of the bile and the pancreatic juice were mixed but who did not develop acute pancreatitis are presented. Bile and pancreatic juice were mixed within the pancreatic duct and drained through the tail of the pancreas because of a presumed surgical injury to the ampulla of Vater in the first patient. In the other patient, bile and pancreatic juice were mixed within the bile duct secondary to a tumor of the ampulla of Vater. The amount of active trypsin in the bile-pancreatic juice mixtures from these patients more or less paralleled that of bile-staining. The levels of chymotrypsin did not follow the bile-staining as markedly. Three of four specimens from the first patient passed through the pancreas without activation. None of these samples was visibly bile stained. All of the other specimens showed varying amounts of active trypsin and chymotrypsin, and it was not possible to determine whether activation had occurred in the pancreatic ducts or whether it took place sometime later during collection or storage. These observations indicate that, while bile may have a role in the production of pancreatic disease, additional factors are required to produce acute pancreatitis. It is possible that trypsin inhibitors contained in human bile and pancreatic juice may bind trypsin.

7199 REPAIR OF BENIGN STRICTURE OF THE COMMON BILE DUCT BY JEJUNAL INTERPOSITION CHOLE-

DOCHODUODENOSTOMY. (Eng.) Wheeler, E. S.; Longmire, W. P., Jr. (Univ. California at Los Angeles Sch. Medicine, Los Angeles, CA). *Surg. Gynecol. Obstet.* 146(2):260-262; 1978.

Repair of benign common bile duct stricture by jejunal interposition choledochoduodenostomy is described and discussed. The interposition of an isolated segment of isoperistaltic jejunum from the obstructed common duct to the proximal duodenum was previously reported and used to treat both obstruction of the common duct in the region of the papilla and recurrent cholecystopancreatitis. The procedure has now been carried out with good results in a patient with benign stricture. An isolated jejunal segment (at least 15 cm in length) is placed in a retrocolic position. Jejunal continuity is re-established by an end-to-end anastomosis. The proximal end of the jejunal segment is closed in two layers, and an end-to-side choledochojejunal anastomosis is performed, with an inner row of interrupted catgut sutures and an outer row of interrupted silk sutures. The distal end of the jejunal segment is then anastomosed in two layers to the side of the proximal portion of the duodenum. A long-limbed T tube is placed in the duct with one limb passing through the anastomosis into the jejunal segment to decompress the biliary system in the initial postoperative period. This technique has special advantages, including that (1) the obstruction is relieved by reconstruction with a mucosal-lined structure, (2) bile is drained into the proximal duodenum, making peptic ulceration less likely, (3) the biliary-enteric anastomosis can be performed without tension, lessening the chance of anastomotic leak, and (4) the length of the jejunal segment in an isoperistaltic direction reduces the likelihood of reflux of duodenal contents into the bile duct.

7200 AN ADDED DIMENSION TO THE OPERATIVE CHOLANGIOGRAM. (Eng.) Byerly, W. G.; Fahl, J. C. (Medical Arts Clinic, Hickory, NC). *Abdom. Surg.* 19(11/12):237-241; 1977.

The records of 87 patients undergoing 88 cholecystectomies with or without operative cholangiograms and with or without common bile duct exploration (CBDE) are reviewed to assess the need for operative cholangiography. Operative cholangiograms were performed in 71 patients, and 10 were abnormal. Of these 10, 3 indicated the need for CBDE, which would have been done anyway because of clinical and laboratory findings; these 3 cases were positive at exploration. Another three cases of CBDE were indicated solely on the basis of the operative cholangiograms, and these cases were negative at exploration, giving a false-positive rate of 4% for operative cholangiography. Of 30 patients who had one or more commonly accepted classical indications for CBDE, 22 were not explored because of a normal cholangiogram. Operative cholangiography was useful in indicating the need for CBDE in two patients where it was otherwise unexpected; in one of these cases, the surgeon elected not to perform CBDE, while in the other case, cholangiography demonstrated multiple common bile duct stones. Operative cholangiography was also useful in demonstrating abnormal ductal pathology in two cases. A value or help rate can be established by taking the number of cases in which CBDE was avoided when otherwise indicated (22), adding the number of cases in which CBDE was indicated when otherwise unsuspected and subsequently proved to have been needed (1), and adding the CBDE procedures saved because abnormal anatomy was identified (2). Thus, 25 of 71 procedures were helpful, giving a value rate of 35%. Of 17 cholecystectomies that included a pathologic diagnosis of acute cholecystitis, 11 had normal operative cholangiograms, preventing unnecessary CBDE in 64.7% of such cases. Twelve postoperative complications occurred in nine patients. One patient died on the ninth postoperative day of massive hemorrhagic pancreatitis; this death was felt not to be related to the cholangiogram but rather to the underlying pathology and operative procedure. Operative cholangiography is concluded to be a cost-effective method of limiting unnecessary surgery.

7201 OPERATIVE PROCEDURES FOR CHOLEDOCHAL CYST. (Eng.) Kasai, M.; Suzuki, H.; Ohi, R. (Tohoku Univ. Sch. Medicine, Sendai, Japan). *Jpn. J. Surg.* 7(3):147-150; 1977.

7202 SEVERE JAUNDICE AFTER RUPTURE OF ABDOMINAL AORTIC ANEURYSM. (Eng.) Hermreck, A. S.; Proberts, K. S.; Thomas, J. H. (Univ. Kansas Medical Center, 39th and Rainbow Blvd., Kansas City, KN 66103). *Am. J. Surg.* 134(12):745-748; 1977.

7203 EVALUATION OF BACTERIA AND BILIARY TRACT DISEASES. (Eng.) Singh, Z.; Wani, N. A.; Misgar, M. S.; Rashid, P. A. (Government Medical Coll., Srinagar, Kashmir, India). *Int. Surg.* 62(10): 564-565; 1977.

7204 GALLSTONES. (Eng.) Bouchier, I. A. D. (Dept. Medicine, Univ. Dundee, Dundee DD1 9SY, Scotland). *Proc. R. Soc. Med.* 70(9):597-599; 1977.

7205 INITIAL EXPERIENCE WITH ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY: THE ROLE IN CLINICAL PRACTICE. (Eng.) Morley, K. D.; Campbell, C. B. (Christchurch Clinical Sch. Medicine, Christchurch, New Zealand). *N.Z. Med. J.* 86(594):169-173; 1977.

7206 GALLSTONE ILEUS AND CHOLECYSTODUODENAL FISTULA. (Eng.) Clifford, W. J.; Garcia, E. L. (Univ. Miami Sch. Medicine, Miami, FL). *Abdom. Surg.* 19(11/12):242-243; 1977.

7207 CHENODEOXYCHOLIC ACID (CDC) INDUCED INHIBITION OF LYMPHOPROLIFERATIVE RESPONSE TO MITOGENS [Abstract]. (Eng.) Podda, M.; Gianni,

L.; Di Padova, F. (Clinica Medica III, Universita di Milano, Milan, Italy). *Digestion* 16(4):346; 1977.

7208 CONGENITAL DILATATION OF THE BILIARY TRACT; NEW CLASSIFICATION AND STUDY WITH PARTICULAR REFERENCE TO ANOMALOUS ARRANGEMENT OF THE PANCREATICOBILIARY DUCTS. (Eng.) Komi, N.; Udaka, H.; Ikeda, N.; Kashiwagi, Y. (Tokushima Univ. Sch. Medicine, 3-18-15 Kuramoto-cho, Tokushima-shi, Tokushima 770, Japan). *Gastroenterol. Jpn.* 12(4): 293-304; 1977.

7209 ULTRASTRUCTURAL STUDIES ON PATHOGENESIS OF INTRAHEPATIC CHOLESTASIS [Abstract]. (Eng.) Sasaki, H. (Third Dept. Internal Medicine, Niigata Univ., Niigata, Japan). *Gastroenterol. Jpn.* 12(4):334; 1977.

7210 ENERGY METABOLISM OF THE LIVER IN BILE STASIS [Abstract]. (Eng.) Sugahara, K.; Mitani, S. (Faculty Medicine, Univ. Tokyo, Tokyo, Japan). *Gastroenterol. Jpn.* 12(4):334-335; 1977.

7211 EFFECT OF FATTY ACID (FA), ALBUMIN, AND BILE SALTS ON ELECTROPHORETIC MOBILITY OF LIPOPROTEIN-X (LP-X) [Abstract]. (Eng.) Simon, J. B.; Poon, R. W. M. (Dept. Medicine, Queen's Univ., Kingston, Ontario, Canada). *Clin. Res.* 25(5):689A; 1977.

7212 ULTRASTRUCTURE OF BOTRYOID SARCOMA OF THE COMMON BILE DUCT. (Eng.) Taura, S.; Taura, M.; Tanaka, N.; Ito, T.; Tsuchiya, R. (Burnsides Res. Lab., Univ. Illinois at Urbana-Champaign, Urbana, IL 61801). *Gastroenterol. Jpn.* 12(4):305-310; 1977.

7213 ENDOSCOPIC CHOLEDOCHODUODENOSTOMY FOR CHOLEDOCHOLITHIASIS THROUGH CHOLEDOCHODUODENAL FISTULA. (Eng.) Osnes, M.; Kahrs, T. (Ulleval Hosp., Oslo 1, Norway). *Endoscopy* 9(3): 162-165; 1977.

7214 ACUTE OBSTRUCTIVE SUPPURATIVE CHOLANGITIS IN A MAN WITH AN ENLARGED INFERIOR PANCREATICODUODENAL LYMPHNODE. (Eng.) Yamamoto, H.; Koizumi, T.; Fujimura, T. (Osaka Koseinenkin Hosp., 4-Chome, Fukushima Osaka 553, Japan). *Gastroenterol. Jpn.* 12(4):317-320; 1977.

7215 PRIMARY CLOSURE OF THE COMMON BILE DUCT AFTER EXPLORATION FOR GALLSTONES. (Eng.) Nagase, M.; Tanimura, H.; Takenaka, M.; Setoyama, M.; Mukaihara, S.; Kamata, T.; *et al.* (Kyoto Univ., Sch. Medicine, Sakyo-ku, Kyoto 606, Japan). *Arch. Jpn. Chir.* 47(1):90-93; 1978.

7216 TECHNIQUE OF ENDOSCOPIC PAPILLOTOMY: BELGIAN CONTRIBUTION TO THE WORLD EXPERIENCE. (Eng.) Cremer, M.; Gulbis, A.; Toussaint, J.; De Toeuf, J.; Vanlaethem, A.; Hemanus, A. *In: The Sphincter of Oddi. Proceedings of the Third Gastrointestinal Symposium, Nice, June 8-9, 1976.* (Basel: S. Karger): 219-227; 1977.

7217 ENDOSCOPIC CONTROL OF SURGICAL SPHINCTEROPLASTY. (Eng.) Rey, J. F.; Tea, J. P.; Ljunggren, B.; Faure, X.; Delmont, J. *In: The Sphincter of Oddi. Proceedings of the Third Gastrointestinal Symposium, Nice, June 8-9, 1976.* (Basel: S. Karger): 213-218; 1977.

7218 OPERATIVE DILATATION OF THE SPHINCTER OF ODDI. (Eng.) Rohner, A.; Weibel, M. A.; Kalfopoulos, P.; Squifflet, J. P.; Moser, G.; Froideveaux, A. *In: The Sphincter of Oddi. Proceedings of the Third Gastrointestinal Symposium, Nice, June 8-9, 1976.* (Basel: S. Karger): 187-189; 1977.

7219 FUNCTIONAL DISORDERS OF ODDI'S SPHINCTER AND OF THE DUODENOBILIARY SYSTEM. (Eng.) Albot, G. *In: The Sphincter of Oddi. Proceedings of the Third Gastrointestinal Symposium, Nice, June 8-9, 1976.* (Basel: S. Karger): 123-128; 1977.

See also, 6776, 6782, 6798, 6807, 6932, 6942, 7025, 7032, 7041, 7072, 7075, 7087, 7107, 7132, 7220, 7247, 7248, 7250.

GENERAL

7220 A CONTROLLED TRIAL OF TAUROLIN IN ESTABLISHED BACTERIAL PERITONITIS. (Eng.) Browne, M. K.; MacKenzie, M.; Doyle, P. J. (Monklands District General Hosp., Airdrie, Scotland). *Surg. Gynecol. Obstet.* 146(5):721-724; 1978.

A double-blind controlled trial of taurolin was undertaken to assess its therapeutic usefulness in peritonitis. For ethical reasons, the trial was stopped as soon as a statistical difference between the two groups emerged. The trial solutions contained either 2% taurolin in 5% polyvinylpyrrolidone or 5% polyvinylpyrrolidone alone, both in normal saline. Patients entered the trial if, at operation, they had gross peritonitis or frank fecal soiling and were then shown to have positive swab cultures in Stuart's transport medium. Up to 200 ml of the randomly chosen test solution (coded A or B) was

instilled prior to closure of the abdomen or afterward via a tube drain. An additional 200 ml could be instilled daily, if required, for up to 7 days. When only 35 patients had entered the trial, solution B proved statistically superior, so the code was broken, and it was confirmed that solution B contained taurolin. A normal recovery with normal wound healing and no sepsis was taken as a good result, and all other outcomes were classified as bad. By this criterion, solution B was statistically more beneficial than solution A ($p<0.01$). The choice of antibiotics was ruled out as having influenced the outcomes. Of 17 patients in group A, 3 died (one of massive pulmonary embolus, causing his removal from the analysis); there were no deaths among the 18 patients in group B. There was a tendency for older patients and women to respond poorly, but neither difference was significant. The morbidity was 39% in group B and 70% in group A. The treatment of severe peritonitis is briefly reviewed. Taurolin is an intraperitoneal antiseptic at least as effective as noxytiolin and easier to use clinically; even in small doses it has a significant effect on morbidity, if not on mortality, over and above powerful antibiotics. It appears to be nontoxic.

7221 CIMETIDINE IN THE MANAGEMENT OF THE ZOLLINGER-ELLISON SYNDROME. (Eng.) Larkworthy, W.; Davies, H. L. (RAF Hosp., Nocton Hall, Nocton, Lincoln, England). *Postgrad. Med. J.* 53 (1626):749-750; 1977.

The case of a patient with the Zollinger-Ellison syndrome who was treated from the outset and continuously for over a year with cimetidine is reported. The patient, a 70-yr-old man, presented with dyspepsia, vomiting, and diarrhea that had occurred in increasingly severe episodes since he had undergone vagotomy and partial gastrectomy 4 yr earlier; the operation had been carried out because of evidence of pyloro-duodenal ulceration, but a carcinoid tumor was found in the pyloro-duodenal region. Endoscopy revealed severe inflammation and multiple ulcers in the lower esophagus and stomach. A giant ulcer involved much of the anterior wall of the stomach and there was also a deep penetrating ulcer of the posterior wall. The gastrectomy stoma was ulcerated throughout its circumference. Basal gastric secretion studies showed a volume of 320 ml/hr and acid secretion of 28.8 nmol/hr. After the patient developed melena and a partial thickness myocardial infarct, cimetidine therapy (200 mg 3 times/day and 400 mg at night) was started. Within 20 min of taking the first tablet, his symptoms disappeared and have not returned. Marked endoscopic improvement was observed as early as 1 month after therapy was begun, with healing of esophageal, gastric, and stomal ulcers.

7222 SURGERY IN 1977. (Fre.) Loygue, J. (Hopital Saint-Antoine, 184, rue du Faubourg-St-Antoine, 75571 Paris Cedex 12, France). *Rev. Prat.* 28(5):333-343, *passim;* 1978.

7223 INDICATIONS OF MECHANICAL STAPLING METHODS IN SURGERY OF THE GASTROINTESTINAL TRACT. SURGICAL RESULTS IN 300 CASES. (Ger.) Rinecker, H. (Chirurgische Klinik Dr. Rinecker, Isartalstrasse 82, D-8000 Munich 70, W. Germany). *Chirurg* 48(4): 241-246; 1977.

7224 THE APPLICATIONS OF THE SUCTION PROBE. (Ger.) Arlt, B.; Schlenkhoff, D.; Arlt, E. (Marienhospital, Holkeskampring 40, 4690 Herne 1, W. Germany). *Therapiewoche* 27(51):9313-9315; 1977.

7225 DISTURBANCE IN SOME METABOLIC PROCESSES IN ACUTE SURGICAL DISEASES OF THE ABDOMINAL ORGANS, COMPLICATED BY PERITONITIS. (Rus.) Kovalev, M. M.; Shevchenko, V. S.; Khachatrian, G. K. (Dept. Hosp. Surgery, Kiev Medical Inst., Kiev, USSR). *Vrach. Delo* (8):92-96; 1977.

7226 EXTRA-INTESTINAL DISEASES AND GASTRO-INTESTINAL DISEASES. (Ger.) Koch, W.; Gerhard, K. H. (Medizinische Poliklinik, Klinikstrasse 8, 8700 Wurzburg, W. Germany). *Therapiewoche* 27(48):8742-8748, *passim*; 1977.

7227 VASCULAR ANOMALIES IN THE DIGESTIVE TRACT. (Ger.) Lux, G.; Fruhmorgen, P.; Rosch, W. (Medizinische Universitatsklinik, Krankenhausstr. 12, D 8520 Erlangen, W. Germany). *Z. Gastroenterol.* 15(10):605-606; 1977.

7228 GASTROINTESTINAL HORMONES AND GASTRO-INTESTINAL DYSFUNCTION. (Ger.) Feurle, G. E. (Medizinische Universitatspoliklinik, Hospitalstrasse 3, 6900 Heidelberg, W. Germany). *Therapiewoche* 27(37):6385-6386; 1977.

7229 IMMUNOGLOBULIN DEFECTS AND GASTROINTESTINAL DISORDERS. (Nor.) Stray, N. (Sentralsykehuset, Medisinsk avdeling, Akershus, Norway). *Tidsskr. Nor. Laegeforen.* 98(1):19-21; 1978.

7230 PSYCHOSOMATIC ASPECTS OF FUNCTIONAL GASTROINTESTINAL DISEASES. (Ger.) Haesler, L. (Deutsche Klinik fur Diagnostik, Aukammallee 33, 6200 Wiesbaden, W. Germany). *Therapiewoche* 27(37): 6417-6424, *passim*; 1977.

7231 ALIMENTATION IN GASTROINTESTINAL DYSFUNCTION. (Ger.) Knick, B. (Deutsche Klinik fur Diagnostik, Aukammallee 33, 6200 Wiesbaden, W. Germany). *Therapiewoche* 27(37):6404-6410, *passim*; 1977.

7232 DIETETIC USE OF PREPARATIONS NORMALIZING THE INTESTINAL FLORA IN CHILDREN: EXPERIENCE AND PROSPECTS. (Rus.) Blokhina, I. N.; Zhukova, N. P.; Faerman, N. N. (Gor'kii Scientific

Res. Inst. Epidemiology and Microbiology, Gor'kii, USSR). *Pediatriia* (7):47-51; 1977.

7233 ASSESSMENT OF CHANGES OF CARBOHYDRATE METABOLISM IN CHILDREN WITH DISEASES OF THE GASTROINTESTINAL TRACT AND THE LIVER. (Rus.) Arsenieva, E. N. (Dept. Pediatrics, N. I. Pirogov Second Moscow Medical Inst., Moscow, USSR). *Vopr. Okhr. Materin. Det.* 22(2):20-22; 1977.

7234 CONTINUOUS GASTROINTESTINAL INFUSION IN CHILDREN. TECHNIQUE AND INDICATIONS IN 170 CASES BETWEEN 1969 AND 1975. (Fre.) Ricour, C.; Duhamel, J. F.; Nihoul-Fekete, C. (Hopital des Enfants-Malades, 149, rue de Sevres, 75730 Paris Cedex 15, France). *Arch. Fr. Pediatr.* 34(2):154-170; 1977.

7235 ZINC DEFICIENCY AND IMMUNOPATHOLOGICAL CHANGES IN THE PATHOGENESIS OF ACRODERMATITIS ENTEROPATHICA. (Hun.) Endre, L.; Katona, Z.; Gyurkovits, K.; Szabo, E. (Gyermekklinika, Szegedi Orvostudomanyi Egyetem, Szeged, Hungary). *Orv. Hetil.* 118(34):2033-2035; 1977.

7236 REHYDRATION IN CHOLERA AND OTHER DIARRHOEAL DISEASES. (Eng.) Bryceson, A. D. M. (Hosp. Tropical Diseases, London N.W.1, England). *Proc. R. Soc. Lond. [Biol.]* 199(1134):109-114; 1977.

7237 CORPORA AMYLACEA IN ADENOLYMPHOMA (WARTHIN'S TUMOR). (Eng.) David, R.; Buchner, A. (Sackler Sch. Medicine, Tel Aviv Univ., Ramat-Aviv, 61999, Israel). *Am. J. Clin. Pathol.* 69(2):173-175; 1978.

7238 Escherichia coli GASTRO-ENTERITIS IN ADULTS. (Eng.) Robins-Browne, R. M.; Jacobs, M. R.; Koornhof, H. J. (Dept. Microbiology, Univ. Witwatersrand, Johannesburg, South Africa). *S. Afr. Med. J.* 53(3):93-94; 1978.

See also, 6594, 6739, 6755, 6756, 6768, 6769, 6785, 6791, 6792, 6798, 6806, 6817, 6824, 6830, 6839, 6844, 6849, 6864, 6912, 6919, 6956, 6960, 6963, 6994, 7002, 7003, 7007, 7024, 7040, 7056, 7104, 7114, 7120, 7157, 7203, 7240.

GENERAL

Parasitology

7239 SEROLOGIC DIAGNOSIS OF EXTRAINTESTINAL AMEBIASIS: A COMPARISON OF STICK-ELISA AND OTHER IMMUNOLOGICAL TESTS. (Eng.) Felgner, P. (Bernhard-Nocht-Institut fur Schiffs- und Tropenkrankheiten, Bernard-Nocht-Str. 74, 2000 Hamburg 4, W. Germany). *Tropenmed. Parasitol.* 28(4):491-493; 1977.

The value of the heterogenous enzyme-linked immunosorbent assay (ELISA) in the diagnosis of amebiasis was compared with that of complement fixation, indirect hemagglutination, counterelectrophoresis, and latex agglutination in 37 patients with amebic liver abscesses and in 20 healthy controls. The reactivity of all sera from the patients exceeded that of the controls in ELISA. There was a positive correlation between the extinction values of ELISA and the results of indirect hemagglutination and counterelectrophoresis at the 1% level. These results confirm that extraintestinal amebiasis can be diagnosed with ELISA.

7240 AMEBIC PERITONITIS FOLLOWING RUPTURE OF AN AMEBIC LIVER ABSCESS: SUCCESSFUL TREATMENT OF TWO PATIENTS. (Eng.) Wallace, R. J., Jr.; Greenberg, S. B.; Lau, J. M.; Kalchoff, W. P.; Mangold, D. E.; Martin, R. R. (Baylor Coll. Medicine, Houston, TX 77030). *Arch. Surg.* 113(3): 322-325; 1978.

The cases of two patients who were successfully treated for amebic peritonitis secondary to rupture of an undiagnosed liver abscess are presented together with a clinical discussion of this complication of hepatic amebiasis. A 37-yr-old man with no history of liver disease presented with fever, dark urine, intermittent right-sided abdominal pain, distended abdomen, decreased bowel sounds, and mild scleral icterus. Abdominal roentgenograms revealed scattered loops of small bowel and a ground glass appearance of ascites. When his condition deteriorated (elevated pulse and temperature, increased pain, disorientation), an exploratory laparotomy revealed a ruptured abscess of the inferior portion of the right lobe of the liver. Numerous trophozoites of *Entameba histolytica* were present in biopsy specimens. Treatment consisted of drainage of the abscess and abdomen, emetine (65 mg/day, i.m. for 6 days), clindamycin and gentamicin for 48 hr, and metronidazole (750 mg, p.o., t.i.d. for 6 days after emetine was discontinued). The patient became asymptomatic, although at 6 months his liver scan was still abnormal. A 36-yr-old man presented with fever, malaise, right-shoulder pain, watery diarrhea, severe right lower quadrant abdominal pain, and diminished bowel

sounds. A chest roentgenogram revealed a probable pleural effusion with elevation of the right hemidiaphragm. Exploratory laparotomy revealed a ruptured hepatic abscess in the superior portion of the right lobe; the abscess and abdomen were drained. Because insufficient tissue was available for histological evaluation of amebic involvement, a serum sample was assayed by counterimmunoelectrophoresis and was positive for precipitins to *E. histolytica*. Treatment consisted of clindamycin and gentamicin for 48 hr and emetine (65 mg/day, i.m., for 6 days) followed by metronidazole (750 mg, p.o., t.i.d. for 8 days). The patient was asymptomatic at 3 months with a minimally abnormal liver scan. The diagnosis of amebic liver abscess should be considered in anyone with a suspected liver abscess, jaundice, or diarrhea in whom peritonitis develops, especially in a patient who has been to Mexico. The optimal therapy for amebic peritonitis is unproved. Surgical intervention is often necessary. Emetine alone or followed by metronidazole after surgical drainage is presently the treatment of choice.

7241 ASCARIASIS. (Eng.) Pawlowski, Z. S. (Medical Acad. Poznan, Poznan, Poland). *Clin. Gastroenterol.* 7(1):157-178; 1978.

7242 STRONGYLOIDIASIS. (Eng.) Filho, E. C. (Univ. Virgina Sch. Medicine, Charlottesville, VA). *Clin. Gastroenterol.* 7(1):179-200; 1978.

7243 Oxyuris, Trichostrongylus AND Trichuris. (Eng.) Wolfe, M. S. (George Washington Medical Sch., Washington, DC). *Clin. Gastroenterol.* 7(1):201-217; 1978.

7244 OTHER NEMATODES. (Eng.) Marsden, P. D. (Faculdade de Ciencias da Saude, Univ. Brasilia, Brasilia, Brazil). *Clin. Gastroenterol.* 7(1):219-229; 1978.

7245 HYDATID DISEASE OF THE LIVER EVALUATED BY COMPUTED TOMOGRAPHY. (Eng.) Kirschner, L. P.; Ferris, R. A.; Mero, J. H.; Moss, M. L. (Commonwealth Doctors Hosp., 4315 Chain Bridge Rd., Fairfax, VA 22030). *J. Comp. Assisted Tomogr.* 2(2): 229-230; 1978.

7246 ECHINOCOCCAL CYST OF THE LIVER SEEN ON COMPUTED TOMOGRAPHY. (Eng.) Newmark, H., III; Smith, J. J.; Burrows, R.; Silberman, E. L. (Century City Hosp., 2070 Century Park East, Los Angeles, CA 90067). *J. Comp. Assisted Tomogr.* 2(2):231-232; 1978.

7247 SURGICAL COMPLICATIONS OF LEPTOSPIROSIS IN CHILDREN. (Eng.) Bell, M. J.; Ternberg, J. L.; Feigin, R. D. (St. Louis Children's Hosp., 500 S. Kingshighway, St. Louis, MO 63110). *J. Pediatr. Surg.* 13(3):325-330; 1978.

7248 BILIARY TRACT DYSFUNCTION IN GIARDIASIS. (Eng.) Goldstein, F.; Thornton, J. J.; Szydlowski, T. (Lankenau Hosp., Philadelphia, PA 19151). *Am. J. Dig. Dis.* 23(6):559-560; 1978.

7249 GIARDIASIS: ASSOCIATION WITH HOMOSEXUALITY. (Eng.) Schmerin, M. J.; Jones, T. C.; Klein, H. (New York Hosp.-Cornell Medical Center, New York, NY). *Ann. Int. Med.* 88(6):801-803; 1978.

7250 BILIARY ASCARIASIS--ENDOSCOPIC ASPECTS: REPORT OF 4 CASES. (Eng.) Van Der Spuy, S. (Livingstone Hosp., Port Elizabeth, South Africa). *S. Afr. Med. J.* 53(25):1030-1033; 1978.

7251 FULMINANT HEPATIC FAILURE SECONDARY TO AMEBIC ABSCESSES. (Eng.) Saltzman, D. A.; Smithline, N.; Davis, J. R. (Univ. Arizona Sch. Medicine, Tucson, AZ 85724). *Am. J. Dig. Dis.* 23(6):561-567; 1978.

7252 THE MANAGEMENT OF AMOEBIC HEPATIC ABSCESS. (Eng.) Perez, J. Y., Jr. (Santo Tomas Univ. Hosp., Suite 220, Espafia St., Manila, Philippines). *Drugs* 15(Suppl. 1):49-52; 1978.

7253 SURGICAL DRAINAGE OF AMOEBIC ABSCESS OF THE LIVER. (Eng.) Nuguid, T. P. (Dept. Surgery, Far Eastern Univ., Manila, Philippines). *Drugs* 15(Suppl. 1):53-57; 1978.

7254 INTESTINAL NEMATODES OF MAN. (Eng.) Zaman, V. (Faculty Medicine, Univ. Singapore, Sepoy Lines, Singapore-3). *Drugs* 15(Suppl. 1):63-69; 1978.

7255 TREATMENT OF MULTIPLE INTESTINAL HELMINTHIASIS WITH OXANTEL AND PYRANTEL. (Eng.) Garcia, E. G. (Inst. Public Health, Univ. Philippines System, Manila, Philippines). *Drugs* 15(Suppl. 1):70-72; 1978.

7256 A COMPARATIVE TRIAL OF OXANTEL-PYRANTEL AND MEBENDAZOLE IN MULTIPLE HELMINTH INFECTION IN SCHOOL CHILDREN. (Eng.) Dissanaike, A. S. (Faculty Medicine, Univ. Malaya, Kuala Lumpur, Malaysia). *Drugs* 15(Suppl. 1):73-77; 1978.

7257 OXANTEL-PYRANTEL IN VARIOUS REGIMENS FOR THE TREATMENT OF SOIL TRANSMITTED HELMINTHIASIS IN RURAL AND URBAN COMMUNITIES. (Eng.) Cabrera, B. D.; Sy, F. S. (Inst. Public Health, Univ. Philippines System, 625 Pedro Gil St., Ermita, Manila, Philippines). *Drugs* 15(Suppl. 1): 78-86; 1978.

7258 A REVIEW OF TRICHURIASIS, ITS INCIDENCE, PATHOGENICITY AND TREATMENT. (Eng.)

Chanco, P. P., Jr.; Vidad, J. Y. (Faculty Medicine and Surgery, Univ. Santo Tomas, Philippines). *Drugs* 15(Suppl. 1):87-93; 1978.

7259 A COMPARATIVE STUDY OF THE EFFECT OF OXANTEL-PYRANTEL SUSPENSION AND MEBENDAZOLE IN MIXED INFECTIONS WITH Ascaris AND Trichuris. (Eng.) Lee, S. H.; Lim, J. K. (Coll. Medicine, Chung-Ang Univ., Seoul 151, South Korea). *Drugs* 15(Suppl. 1):94-98; 1978.

7260 ANTHELMINTHIC EFFECT OF OXANTEL AND OXANTEL-PYRANTEL IN INTESTINAL NEMATODE INFECTIONS. (Eng.) Lim, J. K. (Coll. Medicine, Seoul Natl. Univ., Seoul, South Korea). *Drugs* 15(Suppl. 1):99-103; 1978.

See also, 6721, 6779, 7095, 7112, 7229.

GENERAL

Regional Enteritis

7261 ABNORMAL GALLIUM SCAN IN REGIONAL ENTERITIS. (Eng.) Joo, K. G.; Landsberg, R.; Parthasarthy, K. L.; Bakshi, S. P. (Buffalo General Hosp., Buffalo, NY). *Clin. Nucl. Med.* 3(4):134-136; 1978.

A report of abnormal gallium scan in a case of regional enteritis is presented. A 41-yr-old woman presented with fever, intractable diarrhea, anorexia, and frequent abdominal cramps of 3 months' duration. She had lost 20 lb., was pale and weak, and had a diffusely tender abdomen. A bone marrow biopsy revealed active hematopoiesis and prominent granulocytic hyperplasia without evidence of tumor and the patient was suspected of having regional enteritis. A gallium scan was performed to rule out lymphoma. Two successive scans showed intense uptake of ^{67}Ga in the pelvis as a large, well-circumscribed area of abnormal accumulation, confirming the presence of an inflammatory and/or neoplastic pelvic disease. Radiologic examination of the small bowel demonstrated multiple dilatations of the ileum with interspersed segmental narrowing, cobblestone mucosal pattern, and some areas of vertical ulceration. These changes were most prominent in the terminal ileum, indicating regional enteritis. The site of the abnormal ^{67}Ga uptake corresponded to the ileal lesions seen on the small bowel x-ray. The patient responded to i.v. ACTH and antibiotics, which were replaced after 10 days by p.o. prednisone. Gallium scanning appears to be a useful procedure in evaluating patients with granulomatous inflammation, especially regional enteritis, and it may prove helpful in identifying actively involved sites of disease.

7262 INHERITED DEFICIENCY OF SECOND COMPONENT OF COMPLEMENT AND HLA HAPLOTYPE A10,B18 ASSOCIATED WITH INFLAMMATORY BOWEL DISEASE. (Eng.) Slade, J. D.; Luskin, A. T.; Gewurz, H.; Kraft, S. C.; Kirsner, J. B.; Zeitz, H. J. (Rush Medical Coll., Chicago, IL). *Ann. Intern. Med.* 88(6):796-798; 1978.

Histocompatibility locus antigen studies and studies of the complement system were carried out in a patient with C2 deficiency, inflammatory bowel disease, sacroiliitis, and haplotypes A10,B18 and Aw32,B18 at the major histocompatibility locus and in a family in which all three members had severe inflammatory bowel disease and two had the A10,B18 haplotype. In the patient, serum total complement and C2 hemolytic complement activities were undetectable; levels of the remaining C1-C9 components were normal. The parents, both siblings, and a child of this patient each had half-normal levels of C2 and either the A10,B18 or the Aw32,B18 HLA haplotype. In a second unrelated family, an only child and both parents developed inflammatory bowel disease. The father and child had HLA haplotype A10,B18, but, along with the mother, each had normal serum levels of hemolytic C and C2. Homozygous C2 deficiency, often in association with the A10,B18 haplotype, has previously been linked with various autoimmune diseases and with propensity to infection. The present findings suggest that C2 deficiency or this haplotype also may predispose to inflammatory bowel diseases.

7263 MALIGNANT LYMPHOMA COMPLICATING REGIONAL ENTERITIS: CASE REPORT AND REVIEW OF THE LITERATURE. (Eng.) Collins, W. J. (St. Joseph Hosp., 1100 W. Stewart Dr., Orange, CA 92668). *Am. J. Gastroenterol.* 68(2):177-181; 1977.

The case of a patient with malignant lymphoma complicating regional enteritis is presented and the relevant literature is reviewed. The patient, a 63-yr-old man, had 9 yr of clinical symptoms and small bowel x-ray changes involving more than 50 cm

of ileum and considered diagnostic of regional enteritis. At laparotomy, a segment of ileum was found to be adherent to the sigmoid colon, and fistulous tracts were identified. There was also recent free ileal perforation with peritoneal fecal soiling. The diseased segment and a portion of the cecum were removed surgically, and the histological features of the resected tissue included infiltration of a thickened bowel wall with acute and chronic inflammatory cells including numerous lymphocytes as well as some large histiocytes. The inflammatory changes were interpreted as regional enteritis with an associated peritonitis secondary to fecal spillage. The patient subsequently developed right upper quadrant tenderness and hypotension, a subhepatic abscess, a fistulous tract between the common bile duct and right upper quadrant surgical incision site, pyrexia, and massive gastrointestinal bleeding. A malignant lymphoma of the mixed histiocytic-lymphocytic type was diagnosed after the examination of another segment of ileum and colon. This is the sixth case in which malignant lymphoma developed in small intestine involved with regional enteritis. The duration of illness in this patient is incompatible with a diagnosis of lymphoma, as published series of untreated primary small intestinal lymphomas do not have 5-yr survivals.

7264 VIRAL AGENTS IN CROHN'S DISEASE. (Eng.) Riemann, J. F. (Medizinische Klinik mit Poliklinik der Universitat, Krankenhausstr. 12, D-8520 Erlangen, W. Germany). *Acta Hepatogastroenterol. (Stuttg.)* 24(6):403-404; 1977.

7265 THE MIDLINE INCISION IN PATIENTS WITH CROHN'S DISEASE. (Eng.) Poticha, S. M. (Northwestern Univ. Medical Center, Chicago, IL). *Surg. Gynecol. Obstet.* 146(3):435-436; 1978.

7266 CIRCULATING IMMUNE COMPLEXES IN CROHN'S DISEASE: EFFECT OF MEDICAL AND SURGICAL TREATMENT [Abstract]. (Eng.) Fiasse, R.; Lurhuma, A. Z.; Cambiaso, C. L.; Masson, P. L.; Dive, C. (Service de Gastro-enterologie, Universite de Louvain, Av. Hippocrate 10, B-1200 Bruxelles, Belgium). *Digestion* 16(1/2):210-211; 1977.

7267 THE PATHOGENESIS OF CROHN'S DISEASE. (Eng.) Ward, M. (Royal Brisbane Hosp., Herston Rd., Brisbane, Queensland 4029, Australia). *Lancet* 2(8044):903-905; 1977.

7268 MURAMIDASE (LYSOZYME) IN CROHN'S DISEASE AND IN ULCERATIVE COLITIS. (Eng.) Pruzanski, W.; Marcon, N.; Ottaway, C.; Prokipchuk, E. (Wellesley Hosp., Toronto, Ontario M4Y 1J3, Canada). *Am. J. Dig. Dis.* 22(11):995-998; 1977.

7269 ENTEROVENOUS FISTULIZATION IN CROHN'S DISEASE. (Eng.) Reiner, L.; Freed, A.; Bloom, A. (Bronx-Lebanon Hosp. Center, 1276 Fulton Ave., Bronx, NY 10456). *JAMA* 239(2):130-132; 1978.

7270 LOCALIZED GIANT PSEUDOPOLYPOSIS OF THE COLON IN GRANULOMATOUS COLITIS: A CASE REPORT AND REVIEW OF THE LITERATURE. (Eng.) Ayre-Smith, G. (Vancouver General Hosp., 855 W. 12th Ave., Vancouver, British Columbia V5Z 1M9, Canada). *Br. J. Radiol.* 50(600):916-917; 1977.

See also, 6978, 6979, 7021, 7022, 7027.

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

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DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
NATIONAL INSTITUTES OF HEALTH
BETHESDA, MD. 20205

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BUILDING 31, ROOM 9A21
BETHESDA, MARYLAND 20205

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NIH Publication No. 79-66